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The Evolution of Hidden Champions As Niche Entrepreneurs

Erik E. Lehmann¹, Julian Schenkenhofer²

Abstract

Hidden champions are world-market leaders that emulate a niche strategy. In this research, we illustrate the hidden champions' key business strategies and their evolution over space (geographical distribution) and time (technological change). While we describe their spatial distribution and argue how complementary institutional arrangements embed niche world-market leaders, our historical roadmap sketches the main milestones of how changes in technology and market structures came into existence. The emergence of niche markets is strongly tied to the evolution of technologies within both supplier and end-user markets. Tracing the evolution of niche markets, we derive three different eras of niche markets and exemplary hidden champions of their time: pre-industrial, industrial, and post-industrial. We rely on a few hidden champions that we present more in detail to illustrate their niche market emergence. Moreover, we investigate inventions and technology revolutions of the hidden champions' main industries. Building on Hermann Simon's key insights on hidden champions, we analyze how the academic discussion unfolded onwards after his first seminal contributions. We conclude through presenting fields of future research that will help to further evolve studies on hidden champions.

Keywords: hidden champions, niche strategy, Mittelstand

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1. Introduction

Since the 1980s a new type of firms has entered the economic landscape worldwide, shifting the lenses in academics, business, and politics from the large corporation towards entrepreneurial firms. Corporate America has been replaced by the Silicon Valley Model of Entrepreneurship. This new type of firms has entered the global economy, characterized by outstanding growth rates immediately after their creation, based on scalable business models focused on global markets. The Silicon Valley Model of Entrepreneurship has thus entered the policy agenda around the globe, either in Western or in Eastern countries (like China). Economic performance, national competitiveness and social wealth has been seen as strongly linked and related to this new type of firms. Countries which are not able to spur new venture creation and establishing and fostering global champions like Microsoft, Apple, Amazon, Alphabet (Google) or Meta (Facebook) in the US or Alibaba, Tencent and others in China, will undoubtedly lose their competitiveness and will play only a minor role as a supernumerary in the global economy. Only a few have critically questioned this opinion.

Therefore, Silicon Valley's mass-market technology inventions, immense growth rates and billions of dollar firm valuations have contributed to a one-sidedness of entrepreneurship research (Audretsch, 2021). Welter et al. (2017) attest that research has overemphasized the Silicon-Valley type of entrepreneurship as a standard type. Thus, they call to embrace diverse entrepreneurship manifestations and point to the heterogeneity of other entrepreneurial types and their diverse contexts (Boettke and Coyne, 2009; Welter and Gartner, 2016; Baker and Welter, 2018; Herrmann, 2019; Stevenson et al., 2019; Welter et al., 2019). Following this call, a stream of research has begun to single out a number of other manifestations of entrepreneurship. One of them is niche entrepreneurship, with hidden champions being a prime example of these (Audretsch et al., 2021). In their analysis on the competitiveness and success of the German economy despite the dotcom crisis in 2001/02 and the financial crisis in 2007/08,

Audretsch and Lehmann (2016) highlight that global competitiveness and outstanding economic success is not necessarily linked exclusively to the emergence of a Silicon Valley Model of Entrepreneurship. Contrary to that, many economies are powered by rather small and medium sized companies – with Germany only being one example. A set of these companies have become world-market leaders in highly specific niche markets, and had been termed hidden champions three decades ago by the internationally acclaimed consultant and professor of Marketing, Hermann Simon. He strove to figure out why Germany has consistently been a world-leader in exports: “I came across these world-market leaders, mid-sized companies no one knew about. That’s why I called them ‘hidden champions” (Simon, 1992, p. 115). Hidden champions are rather small to mid-sized companies that also often are technology leaders within their niche market. Yet, they are commonly not well-known to the public given their specific technology and not being listed on capital markets. Also, both the majority of them resides in rural areas and serves industry-to-industry markets. Thus, they are often only known by customers and the local community of their company residence. Although they might only make up a small set of firms, much less than one percent of all SMEs in Germany, they have sparked worldwide research, media and policy attention (Audretsch et al., 2018; Lehmann et al. 2019; Audretsch et al. 2021; Benz et al., 2021; Johann et al., 2021). While interest in hidden champions first arose in Germany, it increasingly disseminates to other countries as well. They play an important role in particular in continental Europe like Greece (Voudouris et al., 2000), Spain (Muñoz et al. (2017), Sweden (Din et al., 2013), among others.

The purpose of this research is to portray hidden champions as an important vehicle in shaping a country's technological and economic competitiveness, reveal their key business strategies and investigate their evolution over space (geographical distribution) and time (technological change). Finally, we illustrate their subsequent growth in academic research. The geographical reach of hidden champions was investigated by Audretsch et al. (2021), who rest their analysis

on the concept of complementarity as proposed by Milgrom and Roberts (1990, 1995) and Roberts (2004). While every firm is surrounded by a complex and dynamic environment, it needs to adapt to the institutional context by carefully designing their organization. Roberts (2004) illustrates that various pattern exist that allow for a fit between certain strategies (organizational choice) and the surrounding context. Thus, Audretsch et al. (2021) point to various complementary context-choice fits that explain the emergence and worldwide distribution of hidden champions. Their results show that economies differ in how they provide hidden champions with an institutional environment that complementarily fits to their individual strategic choices. The second part of this work analyzes the evolution of hidden champions over time. Niche markets often emerge through inventions of novel technologies that often are first pioneered by mass-market corporations (Schot and Geels, 2007), which later allow for the emergence of niche markets. Hidden champions thus originate through establishing finer specializations while adapting to the particular needs of a newly exploited niche.

Despite the increasing popularity of hidden champions in the academia, research interest has just grown in recent years (Schenkenhofer, 2022). While many publications have contributed to investigate them conceptually (Audretsch and Lehmann, 2016; De Massis et al. 2018), research so far mainly has investigated the hidden champions' innovation strategies (Yoon, 2013; Rammer and Spielkamp, 2015, 2019), their meaning for rural prosperity (Benz et al., 2021), their financial strategy (Lebedev, 2013), capital market performance (Benz et al., 2020), internationalization (Audretsch et al., 2018) human capital strategies (Lehmann et al., 2019), and their institutional contextualization (Audretsch et al., 2021), there are many open questions which should be addressed and analyzed. We add to the research field and shed light on the hidden champions' key business strategies and how hidden champions have evolved both over space and time.

The remainder is structured as follows: the first sections introduce the concept of hidden champions in a fundamental way. First, the concept is defined and distinguished from similar concepts (section 2) before the key characteristics of hidden champions are presented (section 3.1). Section 3.2 continues to present empirical evidence from research on hidden champions. From here, section 4 presents the evolution of hidden champions, both geographically and historically. Building on institutional complementarities that explain the emergence of different entrepreneurship manifestations, it first examines the institutional contextual factors that explain the spread of hidden champions (geographical roadmap). It then continues to display the chronological development of hidden champions and their industries (historical roadmap), distinguishing three historical eras. Section 5 outlines the development of the hidden champions' research field in its main milestones. Section 6 then presents the key contemporary discussions around hidden champions. Section 7 concludes and provides an outlook into future research.

2. Defining and Measuring Hidden Champions

Audretsch and Lehmann (2016) dedicated a whole chapter to small and medium sized enterprises (SME), titled 'Small is Beautiful' to highlight the importance of this company type. While SMEs contribute heavily to a competitive advantage for production and manufacturing, they also resemble an important driver of employment stability and economic growth. They often exist in the shadows of large and established companies on the one hand and the dynamic and entrepreneurial new ventures on the other (De Massis et al., 2018). This sitting 'between the chairs' is best expressed by the German word 'Mittelstand', characterizing a subset of SME, where the staff headcount is beyond ten (employees) and sales and turnover below one million Euro, where the exact definitions vary across countries and the EU (table 1, IFM Bonn, 2014)

Under this criterion and view, almost all firms belong to the Mittelstand – 99.6 percent of all firms, which encompass 60 percent of employees and over one-third of sales (figure 1). Worldwide, Germany is critically acclaimed for its Mittelstand model and exhibits the highest share of enterprises accounted for by medium-sized firms in Europe (figure 2).

Scholars have long recognized the paucity of firms existing in the middle of the firm-size distribution, or what has been termed as ‘the missing middle’ (Acs and Audretsch, 1993). In this respect Germany is different. Economic research has shown that in the United States, if firms grow, they tend not to stop growing until they attain a very large size (Hannan and Freeman, 1977; Sutton, 1977; Hannan and Freeman, 1989; Audretsch, 1991; Audretsch, 1995). Systematic empirical studies analyzing large data sets tracking the startup, growth, survival but also failure of companies has identified that entrepreneurial startups in the United States tend to either grow or survive or else are doomed to failure (Audretsch, 1991; Audretsch, 1995; Geroski, 1995; Caves, 1998).

Thus, in an ‘up or out’ industrial structure, there is something of a whole in the middle of the firm-size distribution. Consequently, *The Economist* (2014), praises the Mittelstand “as a group for providing the backbone of the world’s fourth-largest economy, Germany. Individually, they are world leaders in hiding their light under a bushel. They tend to be family-owned, tucked away in small towns and familiar only to the businesses that buy their specialized machinery and components.”

While small and micro firms often miss the minim efficient scale to produce efficiently and thus could not resist exogenous shocks or troubled times, Mittelstand companies do. As Audretsch and Lehmann (2016, p. 16) highlight, the German Mittelstand is an economic heavyweight in several aspects. Not only do most firms belong to the Mittelstand, 99.6 percent, but most employees, 60 percent, are working for Mittelstand companies. Only one-fifth of

German employment is in a large company, which is considerably less than, say, in the United States. And 83 percent of all apprentices came from the Mittelstand. Thus, the Mittelstand is a key source of educated human capital for the industry and service sectors in Germany. Most Mittelstand companies are too small to afford a specialized R&D division. Still, one-fourth of all the 350,000 R&D scientists and engineers employed in private industry are working within these small companies (figure 1).

A further sense conveyed in Germany by the Mittelstand, is more qualitative in nature (ibid.). What constitutes a Mittelstand company is not necessarily any particular size criterion, but rather a common set of values, strategies, governance, finance, human resource practices and orientation (Audretsch et al., 2018). Here the size of the firm is considerably less of the focus but rather the orientation, values and ways of operating are much more germane. Even large companies, such as Robert Bosch and Wuerth, can share the same attitudes, strategies and values of their smaller, more typical counterparts and are generally viewed as belonging to the German Mittelstand.

A subset of the Mittelstand companies has performed remarkably well so that the business consultant and professor of Marketing, Hermann Simon, famously refers to them as hidden champions. He established a framework to describe and identify the main differences and characteristics of these companies. Simon found that Germany's strong exports are not only driven by large corporations, but also by a large number of small and midsize firms. These companies are commonly known only by customers and suppliers and thus are rather unknown to the public: hidden champions. They are 'champions,' given their outstanding position in their market niches, which reflects superior strategies and leadership, and moreover they are 'hidden', as they are almost only known by their customers and suppliers and less so by the general public. Guided by this framework, Simon detected hidden champions everywhere

around the world, though they are most frequent in German speaking countries and some parts of Scandinavia (Audretsch et al. 2018, 2021).

In the following, Simon (2009) defines hidden champions by the following three criterions:

- 1) rank among the top three leaders in the world share of the relevant product market or has the highest market share on the continent of the home country;
- 2) bestow revenues below \$5bn; and
- 3) a low brand awareness of the company and its products.

The research community dealing with SMEs needed about two decades to pursue the concept of hidden champions. Yet, Simon's definition has been firmly established within the research field. While most of the publications use his definition, deviations arise as an adaptation mostly only to country-specific conditions such as the Greek hidden champions sample by Voudouris et al. (2000) or in Din et al. (2013), who examines a Swedish sample of hidden champions, both relying on the national status of the companies. Like Voudouris et al (2000, p. 664), for example, who describe hidden champions as companies that *"(a) are Greek owned, (b) employ more than 20 and less than 250 employees, (c) are internationally oriented by either obtaining some of their revenues from outside Greece or by being part of joint ventures or other types of cooperation with companies from outside Greece and finally, (d) they should have achieved excellent performance, for the last five years (i.e. 1993-7) in several financial measures with the main one being the return on own capital."* Only a few research articles on hidden champions, such as Rammer and Spielkamp (2019), take a much broader definition of hidden champions and include significantly more hidden champions in their sample. They select hidden champions by a top-down approach and do not work with a revenue limit like Simon, but with the restriction condition of a maximum of 10,000 employees.

So, while the definition of the term has become widely established in research on hidden champions, the question of recognizing hidden champions as such differs. Often, comparable concepts are used as synonyms and hidden champions are described as family businesses, Mittelstand or simply SME companies. A clear demarcation can be made here only with the concept of SME, whereby there are many different approaches to define Mittelstand and family firms. Thus, the classification and definition of the term 'hidden champion' is not unambiguous and depends on the underlying definition of the concept.

The concept of Mittelstand firms, on the other hand, is based not only on quantitative approaches, such as that of the EU Commission, but above all on qualitative characteristics of companies. The EU Commission defines them as companies with fewer than 250 employees and an annual revenue of less than €50 million. The IFM defines as companies which are simply characterized by *"the unity of ownership and management. (...) In a medium-sized company, up to two natural persons or their family members (directly or indirectly) hold at least 50% of the shares of a company"* (IFM, 2021). Here, too, the direct proximity and the often-prevailing overlap in the concepts can be seen, as the IFM's definition of medium-sized companies coincides with most definitions of family businesses. For example, Chrisman et al. (2012) defines companies as family businesses if the majority of a firm is owned by a family. The majority of hidden champions indeed are family-owned. In the research field on family firms, determining the nature and distinguishing characteristics of family firms is a significant area of study (Chrisman et al., 2016). Generally, a variety of different definitions can be found in the family business literature defining family businesses (Carney et al., 2017; Erdogan et al., 2020), which makes a clear delineation challenging.

Analogously, the ambiguous delineation of concepts and thus versatile use of the concept hidden champions has implications on the comparability and significance of analysis results. It is a dilemma when different articles talk about hidden champions and want to give empirical

validity to the concept but include different types of companies in their samples. The sampling bias in this case reduces the generalizability of the results. This bias is further magnified by the fact that there is no database or fixed principle that would delineate niche markets as such. Depending on how narrowly hidden champions define their markets, they declare themselves to be world-market leaders (Schenkenhofer, 2022). As a result, the title of being a world-market leader can also be used to create a brand and for the company's own self-image. Therefore, data samples often have to rely solely on the self-declaration of companies to lead a niche market (ibd.). This in turn has far-reaching consequences for the empirical validity of empirical results.

Thus, it becomes clear that hidden champions can, but do not have to, fulfill criteria of SME and Mittelstand definitions in addition to the definition of Simon (2009). A distinguishing factor to differentiate hidden champions from non-hidden champions SMEs and Mittelstand companies is the niche strategy. Thus, the concept of hidden champions can be approached via the form of market type and Porter's generic competitive strategies. Porter (1980) distinguishes between the source of competitive advantage and the market form. The source of competitive advantage can be based either on a cost leadership strategy or on a differentiation advantage. The market form, on the other hand, represents either a mass or a niche market. Hidden champions target a mix of differentiation and niche and operate in highly specialized markets that are unattractive to corporations due to limited consumer demand. Large companies would have too little profitability in the niche markets due to the lack of economies of scale.

Hidden champions instead operate in oligopoly markets. Often, they are the only suppliers in some parts of the world, and often they have no more than 2 or 3 competitors worldwide. The analysis about the type of the market allows a deeper insight into the economic logic of the hidden champions. Thus, their corporate strategies can be understood here as responses to market specifics and the type of the equilibrium in oligopoly markets. Here, it is a mistake to assume that hidden champions do not have to deal with competitors. World-market leadership

does not exempt them from keeping a sharp eye on rivals. The close battle for market share is particularly fierce in competitive oligopoly markets, where shifts can result in large losses or gains in market share, and suppliers can quickly be squeezed out of the market completely by market shifts, and thus quickly become a target for M&A. Moreover, brand strength alone is not sufficient in niche markets, as the quality of the technology is often the biggest selling point in highly specialized niche markets – both in industry-to-industry and industry-to-consumer markets. Thus, technology leadership is key to retaining customers in the long-term (Kamp, 2019). The fact that customers are highly dependent on the niche technology implies that companies at the edge of the market are marginalized more quickly because they are less able to meet quality standards as expected.

3. The Concept of Hidden Champions

Building on the differentiation between SMEs and hidden champions as displayed in section 2, literature analyzing hidden champions is focused on seven key characteristics, where both concepts differ. These key characteristics could be defined as key strategic variables, determining the success and sustainability of hidden champions. The strategic advantage is based on the key concept of hidden champions – the complementarity generated by the interactions of these key variables. Section 3.1 introduces the key characteristics of hidden champions, section 3.2 then shows how these assumptions have found empirical evidence.

3.1 Key Characteristics of Hidden Champions

The key characteristics, as summarized in table 2, are, by definition, a strong focus on international target markets, based on incremental innovations and a flexible manufacturing and production process. This requires a specific human capital endowment of their employees.

Moreover, hidden champions are associated with a solid financial basis, a strong rural embeddedness and a specific leadership style. The underlying organizational architecture eventually is decisive to govern the complementarity among these characteristics, as both a decentralized decision-making authority and flat hierarchies encourage employees towards a creative impetus for innovation.

Long and trustful relationships to key customers are expensive in contrast to contractual arrangements, requesting time consuming activities from the top management or business owner. Otherwise, they are strong complementary in the innovation process. New products, services, and processes are often the result of an incremental innovation process together with the key customers. Incremental innovation, changes in products and services drives the value of speed and flexibility that requires the use of highly skilled workforce, with worker initiatives and a delegation of authority towards teams that can both manage the complexity and overcome the problems as they appear, rather than to stand still and wait for the top managers to step in (Roberts, 2004). Thus, ability and training work complementary with innovation, flexibility and close customer relationships, and human resource management a focal aspect of leadership (ibd.). To best capitalize on the workforce's skills and abilities, empowerment, cross-functional training, job enrichment and enlargement, are complementary. With skilled workers with firm specific human capital who are especially well-informed about the firm's activities and the customer needs, it is a priority to establish long-term employment relations, resulting in rather low turnover rates (Roberts, 2004; Audretsch and Lehmann, 2016, p. 27). Such long-term employment relationships are also associated with lock-in effects. Investment in general but also firm specific human capital are sunk when workers can easily take their 'human knowledge' and walk out of the door. Lock-in effects also exist for workers when their outside opportunities for an employment may lead to lower wages or other adverse effects. This may result in the well-known problem of underinvestment in relationship specific investment by

both parties, the workers and the firm. Hidden champions overcome this problem by their location in a rural environment. Most of the hidden champions are located in rural areas (Audretsch and Lehmann, 2016, p. 33). At a first glance, the geography of hidden champions seems to contradict the conventional wisdom concerning locational advantages for innovation and competitiveness. But as Audretsch and Lehmann (2016) show, a rural location outside large cities is complementary to other choice variables, like close relationships to workers, suppliers, financiers or policy makers. These small villages and towns where the hidden champions most often are located are ‘hotspots’, which serve as a magnet offering an attractive lifestyle for talented engineers, managers, and workers, attracting also other companies and firms thus providing a comprehensive business ecosystem with a complementary infrastructure. Also many of these small villages are the home of universities or universities of applied sciences, a fruitful source of scientific spillovers and strong university-industry relationships (Lehmann and Starnecker, 2012; Schenkenhofer and Wilhelm, 2020; Starnecker and Wirsching, 2022).

When context-choice variable pairs, as shown by Audretsch et al. (2021), are complementary, any change in the environment that would increase the attractiveness to raise one of the variables, is likely to result in all of them being increased. This eventually results in systematic, predictable patterns for the direction of choice variables given their response to environmental change, as Audretsch et al. (2021) analyze for hidden champion firms. Examples here include building a stock specific human capital (choice variable) and a complementary centralized vocational education system (context variable), or long-term family control (choice variable) and dualistic board systems (context variable). Giving an example, the authors describe that the vocational education system in Germany especially fits the demand of hidden champions for specific human capital. As vocational education in Germany exhibits the nature of a public good for which the state and participating companies share the cost, trainees are incentivized to invest in their stock of specific human capital. The complementarity between the choice and context

variable arises against the background of niche technologies that call for highly specific skills, which require a long-term investment by both the employer and the trainee. The hold-up problem of firm-specific investments and the resulting reluctance of employees to invest in ever-tying relationship specificity, is mitigated by the public nature of vocational education in Germany.

3.1.1 Intensive Internationalization

As defined further above, hidden champions are world-market leaders in their niches, expressed by a high degree of internationalization. A niche market results from segmenting a larger market and it is distinguished through its own unique needs and preferences. Hidden champions carve out niche markets and position their self as the go-to technology for a specific audience, their key clients, resulting in a highly focused international business (Audretsch et al, 2018).

The hidden champions' literature has so far examined mainly two key characteristics of niche world-market leaders: their internationalization strategies, and their R&D and innovation strategies (Schenkenhofer, 2022). Hidden champions derive between 60 and 80% of their sales from foreign markets. This high proportion can be explained by their niche strategy. The high degree of specialization of their range of products and services means that only a few suppliers offer their products and services in niche markets. As a result, hidden champions attract market demand worldwide from the moment they are founded and operate in narrow oligopoly markets. They tend to put a strong focus on narrow product class niches rather than on broad product categories, enabling them to be more targeted and efficient in investing scarce resources. Such a core strategy focusing on a narrow product class niche yields several strategic advantages (Audretsch and Lehmann, 2016, p. 33): For one thing, focusing on a narrow and specialized niche product typically accounts for only a small share of the total purchasing expenditures of their client and thus reduces downward pressure on prices. In addition, the products

manufactured by hidden champions are often essential and indispensable to their customers, which tends to reduce the extend of any negotiating power and outside opportunities of their customers. In sum, such a core and niche product strategy arises some monopoly power to the hidden champion company, making them also more resilient in the face of exogenous shocks.

Their internationalization is thus largely simultaneous (Audretsch et al., 2018) and differs from the internationalization processes in the mass-market (Johanson and Vahlne, 1977). Witt (2015) investigates internationalization strategies of hidden champions in the UK. She analyzes the form and timing of market entry into foreign markets. Her study confirms that hidden champions mostly function as born-globals, simultaneously attracting global demand after company foundation. Hidden champions almost exclusively internationalize through direct exports and an astonishingly high number of wholly owned subsidiaries (Audretsch et al., 2018). Simon (2009) estimates the average number of directly owned subsidiaries of hidden champions at 24. According to his analysis, 16 engage in sales and service and 8 in manufacturing and sales. The internationalization strategy of hidden champions is thus a strategy of vertical integration. Hidden champions are highly focused companies that meet an extremely specific set of needs in a niche market. Their knowledge-intensive goods must meet complex customer needs in terms of both quality and safety standards. They strive for technology leadership through their qualitative differentiation, which secures their market leadership. A high degree of value added is therefore key to the hidden champions' corporate strategy. Vertical integration in their internationalization strategy is fundamental to guarantee quality standards and avoid knowledge drain (Audretsch et al., 2018).

3.1.2 Incremental and Open Innovation

Incremental and open innovation are two related vehicles to organize a firm's innovation process. While the term 'incremental innovation' describes a series of small developments of a

company's products or services (Henderson and Clark, 1990; De Massis et al., 2018), the term 'open innovation' expresses that these improvements are the results of a strong collaboration with actors outside the boundaries of the company (Lambrechts et al. 2022). While innovations are a necessary condition for a company's competitiveness and sustainability, this process does neither request groundbreaking innovations nor that this process have to be done within the close boundaries of a firm. Hidden champions in fact spend less on research and development and more on marginal improvements to existing products in close cooperation with their key clients and suppliers to retain customers, remain relevant, and balance their own innovation portfolios (Andreeva et al., 2016; Purg et al., 2016; De Massis et al., 2018). Identifying the needs and preferences of key clients requests a close cooperation with them, resulting in an open innovation system. As Lambrechts et al. (2022, p.1) point out, 'openness' *"has become an established norm in the contemporary business environment. However, despite the crucial importance of boundaries and boundary work in organization and management theory, openness —as opening up boundaries of family firms and entrepreneurial families in collaborating with external actors— has received only nascent attention in the family business domain"*. Hidden champions, as majorly family-owned firms with an entrepreneurial orientation, are the prototype of an open innovation firm with a strong focus on collaborating with external actors like key clients and key suppliers. The highly specific and knowledge-intensive products and services of hidden champions require high efforts in terms of R&D and innovation investment in order to meet the high demands of customers. This process involves a continuous balance between a number of facets, such as inclusion and exclusion, dependence and autonomy, freedom and control, and also flexibility and stability (Bacharach et al., 2000; Lambrechts et al. 2022).

To cope with these challenges, hidden champions act as typical entrepreneurial firms, especially through stimulating their workforce to behave as if they were entrepreneurs. Hidden champions

are champions in pursuing intrapreneurship, i.e. to master the challenges of the increased global competition by enabling their employees to act like entrepreneurs in the process of open innovation (Audretsch et al., 2018). In this context, absorptive capacities are a part of a hidden champions' intrapreneurial capabilities. In order to stimulate a firm's ability to innovate both products and operational efficiency, it is essential that these capabilities are continuously developed and leveraged. Absorptive capacities resemble a key resource for hidden champions to foster the evolvement of new ideas that help to enable sustainable competitiveness. The niche products of hidden champions are highly differentiated in nature and have to meet high quality and often also high safety standards. Once the niche market is established, there is hardly any need for hidden champions to disrupt their own markets. Instead, their technology development is geared to the leading developments in the end customer market and the needs of their customers. Customers are thus given a central role in the innovation strategies of hidden champions. The high level of interdependence in the mutual lock-in in the narrow niche market promotes high specific investments on both sides, as explained above. The long-term nature of the close customer relationships means that customers build up a high level of specialist and product knowledge. The narrowness of the niche market and the high degree of interdependence between supplier and customer thus allow a particularly close and intensive exchange between customers and hidden champions, which has a significant influence on product development. The innovation strategy results as open innovation and as an outside-in process, where customer plays a leading role and plays a key role in driving product development. The innovation process with key clients also reveal another aspect of 'hiddenness', in that the innovation is secretly kept within the company. Patenting is not only time consuming and associated with high costs but also reveals the effort to others. Thus, hidden champions typically prefer to shield their intellectual property along with their innovative activities not just from public scrutiny but also from their competitors, so that investments in R&D are almost always understated

(Audretsch and Lehmann, 2016). Hidden champions thus are known personally by their key customers but prefer to remain rather hidden to their competitors. While on average hidden champions in Germany own five times as many patents as do larger and publicly owned companies in relations to their size, they also typically deploy the strategy of obscuring their innovative activities and limiting their transparency. Rather than patenting intellectual property, hidden champions have a propensity to keep new ideas and technologies a trade secret – hidden to their rivals and competitors.

Thus, hidden champions in pursuing their open innovation strategy also support close relationships with local universities and cooperate enthusiastically with them to generate new products and technologies. Such close and nearby cooperation also facilitates access to knowledge spillovers, in particular to young talents, to incrementally improve their flexible production and manufacturing process. Hidden champions continually and relentlessly improve their products and technologies until the top position in the market is attained (Audretsch and Lehmann (2016, p. 33). In doing that, hidden champions exhibit remarkable persistence and tenacity in pursuing and implementing their core strategy of continual product quality improvement and incremental innovations. The close and trustful relationships forged between key clients and hidden champions are conducive to continual quality improvements and incremental innovation. According to Simon (2009), such close and durable relationships with their key clients are the secret and power of the strategy driving competitive advantage of hidden champions.

3.1.3 Flexible Production and Manufacturing

Flexibility of a manufacturing system can be expressed by the speed with which a firm can switch from manufacturing one product to the other. Incremental and open innovation requests a flexible manufacturing system with low switching costs to react to the changing needs and

preferences of key clients (De Massis et al., 2018). Flexibility is thus complementary to strong and trustful relationships to key clients in niche markets, as described in section 3.1.2, which often request a change in product or services ‘overnight’ (Audretsch and Lehmann, 2016, p. 36). As Alexander Starnecker, CEO and owner-manager of Weißer Spulenkörper, a hidden champion of technical plastic parts, emphasizes: “Customer satisfaction and loyalty is the most important output of our innovation effort” (Audretsch and Lehmann, 2016, p. 31). Flexibility and a narrow product line are also complementary, since decreasing the product line increases flexibility – and niche markets are markets of highly specialized products and services, often tailored to one or a few key clients. The flexibility of the manufacturing process applied by hidden champions also reduces lock-in effects to particular suppliers and key clients by reducing the hold-ups costs and thus fostering relationship-specific investments, which is supported by the adoption and development of long-term relationships with both key customers and suppliers.

3.1.4 Specific Human Capital

Open and incremental innovation and lean manufacturing request specific human capital employed by highly skilled workers. Human capital is shared by employers and workers and the set of employee skills that is rented to the employer. Human capital refers to all knowledge components, all skills and abilities, experience, knowledge, and assets that are inseparably linked to an employee (Becker, 1964). Becker (1962) points out that it is helpful to differ between general and specific human capital. While general human capital is characterized by general education and training and is valued equivalently by a wide range of firms, like using standard software programs or numeric controlled machines, specific human capital makes the difference. Specific human capital instead is more valuable to the current firm than it is to any

other alternative employer (Brickley et al., 2006). Firms benefit if their employees invest in firm specific human capital, like specialized and flexible manufacturing and production based on computer aided machines and robots or even firm specific accounting software. While companies benefit from firm specific investments, employees are reluctant to invest, since investing in firm-specific human capital reduces their outside opportunity costs. The problems are clear-cut: less investment in firm-specific human capital reduces not only the ability and willingness of employees in the production and incremental innovation process, but also their ability to work with specialized machines and apparels, which is the precondition to pursue the core strategy of a focus on a narrow and specialized product niche. One way to cope with this problem is the investment in long-term employer-employee relationships, which provides incentives for both parties, to invest in specific training, education and skills. If both, employers and employees expect a rather short-lived relationship between each other, the incentives are limited for such an investment. Contrary to that, if the relationship between both is expected to endure, firms and employees are able to internalize the quasi-rents made through their investments in firm-specific human capital. Lehmann, Schenkenhofer and Wirsching (2019) show that countries with a centralized vocational training system have an advantage in building up the stock of specific human capital. Through the training, young talents are bound to the company early after school time and carry out numerous tasks in the company (and therewith build up specific human capital) during their training in addition to school lessons (where they acquire general human capital) and thus become part of the company at an early stage (Campbell et al., 2012; Coff and Raffee, 2015).

Audretsch and Lehmann (2016, p. 27) point out that such long-term relationships are one of the key characteristics of hidden champions, expressed by the annual turnover rate and the average length of service. While the mean annual employer turnover rate in Germany is even greater than 7.3%, in the United States, nearly one-third of workers leave their companies each year.

This rather low turnover rate in Germany is one explanation for the highly specialized workforce in Germany compared to other countries. While the turnover rate in Germany is rather low compared to other countries, it is remarkably low for hidden champions, with less than 3 percent. By contrast, the turnover rate for Daimler Benz (Mercedes), which has the reputation of being a company with exceptional worker loyalty and low attrition, is still nearly as twice as high (ibid., p. 27). The low turnover rate of workers employed by hidden champions translates into an average tenure time spanning thirty-three years, in contrast to the United States, where the high turnover rate translates into a mean tenure of less than four years (ibid., p. 27). Such a strong employee loyalty exhibited by hidden champions generates at least two types of cost savings and contributes to the competitive advantage of hidden champions. The first is that only a small share of investments in labor skills and accumulated experience of employees are lost through employee attrition and turnover. The second is that the costs incurred in screening, interviewing, vetting, and hiring new employees, along with their low productivity during the learning phase of employment, are minimized. When compared to the whopping mean employee turnover rate in the United States of 30.6%, hidden champions are able to reap a considerable comparative advantage vis-à-vis global rivals and competitors.

Such long-term relationship not only allow both employers and employees to internalize the benefits of accumulated firm-specific human capital, but also team spirit, a strong ambition by employees, and a commitment for both parties. Long-term relationships increase the flexibility of employment relationships. Hidden champions are keen to design family-friendly policies and support employees through flexible working hours and places, or even a sabbatical leave, where possible. On the other hand, such a family-friendly policy makes both, the company and the employee more resilient towards exogenous shocks, like the Covid Crisis in 2020/21 or the crises caused by the Russian raid against the Ukraine in 2022.

3.1.5 Solid Financing

Financial independence is another key characteristic of hidden champions. Financial independence does not necessarily mean that a corporation is not restricted by financial resources, but that necessary investments can be made without a conflict of interest induced by equity and debt holders (Jensen and Meckling, 1976). Such a solid financial basis does not necessarily mean that the capital structure of a firm is neither based on debt nor outside equity and that all the investments made are due to accumulating past revenues. Financial independence also results in market power towards shareholders and providers of debt, like banks. While today the possibilities of borrowing and financing investments is manifold, ranging from crowdsourcing, to different kinds of lending, from venture capital to bank lending, from IPOs to SPACS, or emitting Bonds, hidden champions in general pursue their own financial strategy: relationship banking.

Hidden champions in continental Europe usually finance themselves through a relatively high equity ratio and a house bank. The house bank principle describes that SMEs *"give priority to one bank which runs the core of their banking business, banks give priority to their house bank customers, the relationship is long-term, stable and regarded as a partnership."* (Quack and Hildebrandt, 1997, p.1). While relationship banking by house banks - banks acting as the main creditor and debt holder to a firm - has been established as a means for small and medium sized companies as a mechanism compensating for their lack of credit history (Lehmann and Neuberger, 2001), hidden champions have established close relationships to their often nearby located house banks to increase their flexibility and independence. While liquidity constraints are most important for young and new firms, where information asymmetry is the main driver of receiving external capital, this does not hold for established companies with a long credit history. Such close lending relationships not only decrease the costs and availability of borrowing, they also lead to a solid financial basis, even in times of stress, when those banks

often act as the ‘lender of last resort’ (ibd.). While the external capital market in Germany and most of the continental European Countries remains rather underdeveloped compared to their Anglo-Saxon counterparts, hidden champions in continental Europe typically rely almost exclusively on banks on their external resources of finance (Audretsch and Elston, 1997).

While banks provide advice to family businesses in a long-term strategic orientation (Block, Cumming and Vismara, 2017), they require that businesses keep their deposits with the same bank in return. Thus, the cooperation allows mutual liquidity and builds mutual trust in a close relationship through the long-term and close cooperation (Lehmann and Neuberger, 2001). Mutual prioritization thus allows building strategic cooperation advantages, investments are oriented to security and risk reduction. A further advantage of financing through savings banks is the proximity between the bank and the hidden champion, which tends to exist less for large corporations or other types of companies. The spatial proximity, often in rural areas, causes a high degree of mutual dependence between hidden champion and bank. The mutual lock-in promotes specific investments on both sides. The long-term nature of the relationship, which often spans generations on both sides, increases transaction frequency and mutual trust. Such a partnership allows close cooperation and often also non-bureaucratic and rapid assistance (Ehrhardt and Nowak, 2003).

Contrary to this, there is a minority of hidden champions who have gained access to the capital market through their stock exchange listing (Johann, Block and Benz, 2021). Databases on hidden champions show that the proportion of hidden champions listed on a stock exchange totals at only one third (Simon, 2009; Schenkenhofer, 2022). Simon explains that for hidden champions it is usually a conscious strategic decision not to list on the stock exchange. A stock exchange listing would therefore contradict a cornerstone of the strategy of hidden champions: to be hidden and to remain hidden. For Simon, not being listed is often an expression of flying under the radar. Too much attention would challenge their supremacy of their highly specific

niche markets. The better known their niche, the more likely hidden champions would make themselves vulnerable to attack. In addition, listing on the stock exchange entails an organizational complexity that hidden champions would like to avoid. Complying with complex regulations and reporting guidelines is an additional expense for hidden champions, which can reduce their organizational agility. Due to their small size, a listing on the stock exchange would entail additional expense that would often not be profitable for hidden champions (Simon, 2009).

3.1.6 Rural Endowment

Just as the champions are hidden, so too are the locations of their headquarters and production plants. Most of the hidden champions were founded decades or even centuries ago in small and medium sized cities all over Europe and even in the United States. They often were founded as a handicraft business offside large cities, like *Würth*, which was founded by Adolf Würth (1909–1954) and has manufactured all types of screws since 1945. It was founded in Künzelsau, a city of about only 15.000 inhabitants. Here, in 1954, his son Reinhold Würth took over succeeding his father's role, only 19 years old. Throughout the following decades, Würth became one of the world-market leaders for fasteners and tools offering a staggering 125,000 different products. Like Würth, a plenty of hidden champions are still located in rather small and peripheral towns. While the location aside of large cities with their infrastructure, their banks, big customers, and suppliers and more importantly - supply of labor force - may have been less disadvantaged at the time of founding the company, the disadvantages today are obvious. Access to critical resources, labor, capital, know how but also customers and suppliers has become increasingly important, increasing the disadvantages of being located far away.

To overcome the disadvantage of being hidden for consumers, clients, financiers or employees, such companies have to put more effort and creativity into signaling their existence – or just relocate to large cities. Hidden champions pursued the first way, turning the disadvantage into a strategic competitive advantage. Larger agglomerations not only provide an easier and more direct access to resources, they also increase the competition about these scarce resources. Thus, hidden champions started to invest in close relationships with key players in their small rural ecosystems: long-lasting relationships to employers and banks, as highlighted before, but also to policy makers and the rural society in general. Crucial to this is regional policy support and investment in educational opportunities, the housing market and infrastructure to keep the labor markets of rural hidden champions attractive. A mass rural exodus would pose serious problems for rural hidden champions. Hidden champions are often the economic and social core of these cities, active in sponsoring culture and sport events, thus keeping strong social contacts to the rural society. Such a cooperation pays for both parts, building a special ecosystem around the hidden champion firms. Furthermore, hidden champions often appear within a cluster of firms in the same or nearby industry, like the world leading cluster in medicine technology, called MedicalMountain, in Tuttlingen, a city with less than 35,000 inhabitants but more than 12,000 people employed in this sector. Three hidden champions, Aesculab, Karl Storz, and KLS Martin Group compete with more than 400 small and medium sized companies in a worldwide market. In such an industry cluster, they benefit from knowledge spillovers and the innovation capacity of this region, which is shaped by a few hidden champions. The literature attributes an advantage to rural hidden champions in this respect, as they often have to compete with only a few employers for employees in their regions (Benz et al., 2021; Rietmann, 2021a). Although hidden champions are generally characterized as companies with a low profile and a low employer brand compared to large corporations, they are usually the largest and best-known employer in their relevant labor markets. Thus, the mobility of employees is already

significantly limited by the low outside opportunities in rural labor markets. Long company tenure deepens employees' involvement in both social networks inside and outside the company. Mitchell et al. (2001) describes the concept of job embeddedness in this context, which refers to the attachment of employees to the place they work and live in. It describes "the extent to which people have links to other people or activities, (2) the extent to which their jobs and communities are similar to or fit with the other aspects in their life spaces, and, (3) the ease with which links can be broken" (ibid., 2001, p. 1104). Thus, social capital builds up over the time employees spend with the company, which is lost when they change jobs. In this sense, changing jobs in the countryside often also means changing a place of residence, which would also mean losing the social capital that is tied to the location and not specific to the company.

Another advantage is that most part of the value chain in production is located in such a single region, which enables companies to learn from each other, thus fostering incremental innovations for each of them and learning what each needs to be globally competitive and innovative (Audretsch and Lehmann, 2016, p. 34). Furthermore, close relationships to key suppliers lowers transaction costs like monitoring and, more and more important in the future years, also transportation costs. The innovation capacity of these regions is further improved by the location of higher education institutes, namely the universities of applied sciences, or the location of research institutes like Fraunhofer Society, where close relationships with hidden champions have been established over the years (Audretsch and Lehmann, 2016, p. 74; Lehmann and Starnecker, 2012; Schenkenhofer and Wilhelm, 2020; Starnecker and Wirsching, 2022).

Moreover, these small and rural regions benefit from hidden champions. Hidden champions, on the other hand, are unusually large companies for their rural location (Rietmann, 2021b; Vonnahme and Lang, 2021). On average, they have more than 2,500 employees (Simon, 2009; Schenkenhofer, 2022) and thus have the potential to function as the engine to retain human

capital for an entire region (Block, 2019). Like the located companies are hidden champions, so are these towns hidden champions regarding the quality of live. Many of these cities has been established today as touristic hot spots, attracting not only tourists but also talented engineers, managers, and workers from outside. A high quality of live with low costs of living, compared to high dense cities and regions, low crime rates, low costs of housing can easily take priority over any disadvantage of being geographically isolated.

3.1.7 Long-Term Leadership and Organizational Architecture

The leadership style in hidden champions is a decisive resource since clear guidelines can be established through long-term company affiliation. The high leadership continuity of the board members in hidden champions, which Simon measures at an average of 20 years, shows how high the identification of the hidden champions' leaders truly is. But employees also stay with the company for longer than the average, given the low turnover rates of hidden champions (Simon, 2009). This creates an environment in which the company climate can be shaped over the long-term. An alignment of common goals and values is thus given and a prerequisite for identification on the part of employers and employees. A management style thus has the possibility to extend all over the company and to anchor itself deeply in the consciousness of the employees. Hidden champions are stand-alone businesses and evolve from the founders' visions. One of their most important challenges is to find talented employees, shaping a new organization instead of transforming an already existing one and finally to perform the management duties being key to grow the whole business (Wasserman, 2006). Expectations of attitude and behavior can thus be explicitly signaled, especially since the possibility of consistency in this leadership is given.

The literature attributes an ambivalence to the leadership of hidden champions. On the one hand, their leadership is patriarchal-authoritarian and yet shows components of a participative leadership style. How is this possible? The reason lies, (1) on the one hand, in the leadership aspirations and self-image of many CEOs of hidden champions, and, (2) on the other hand, in the organizational architecture of hidden champions.

Every company must adequately coordinate and motivate its employees. For this purpose, they design an organizational architecture that motivates employees through suitable contracts, exemplary leadership or the corporate culture (incentive structure) and describes which activities are coordinated by which person at which location and in which manner (organizational structure). Thus, a coordination scheme defines task profiles and decision-making authority (Jost, 2014). For hidden champions, the organizational architecture is a key component of a complementary corporate strategy. Their corporate strategy in particular showcases that leadership styles can only develop in their complementarity to the organizational architecture of companies. Thus, the ambivalence manifest itself at different levels (Simon, 2009). While the basic strategic direction and the vision of the company are imposed from top-level, operational leadership is participative.

The unrestricted claim to leadership of the CEOs of hidden champions is based on various factors. Family ownership establishes a moral authority that, unlike large and broadly diversified corporations, they are usually fully liable for the company assets with their private assets. Often, the firm has been owned by the founding family for generations and would span a dynasty. Thus, the family name and thus an immense reputation is directly and closely linked to the company. The close integration of hidden champions in the regional context in particular further increases the exposure of the entrepreneurial family. Moreover, the responsibility grows through the number of employees and turnover: the larger the family empire, the more feel they have the moral authority to preside over the company. Also, in family businesses, the

competition for succession and favors within the family mixes up with pure business aspect, which often leads to a consistent and patriarchal line of leadership. However, the self-image of the company leaders is not only explained by dynasty continuity and company size, but another reason also lies in technology and world-market leadership. The enthusiasm for technology and an identity-forming leadership of the world-market feed the self-image of hidden champions in terms of pride and self-concept.

Therefore, one part of the hidden champions' leadership can be described as authoritarian, which is defined as a *"leader's behavior that asserts absolute authority and control over subordinates and [that] demands unquestionable obedience from subordinates"* (Cheng et al. 2004, p. 91). It asks for the *"unilateral decision-making through the leader and strive to maintain the distance between the leader and his or her followers"* (Schuh et al., 2013, p. 632; Aryee et al., 2012; Bodla et al., 2019). Leadership of this kind uses the power-asymmetry between leader and followers to install a personal dominance and to centralize control. In contrast, the literature describes the participative leadership style as leadership *"that involves employees across levels of the hierarchy in decision-making"* where participative leaders *"involve their subordinates in making and implementing decisions. They seek subordinates' input on important decisions and value others' points-of-view. Participatory systems allow employees to use their voices to influence internal and external strategy, protect organizational responsiveness, and hold the managers accountable."* (Spreitzer, 2007; Rok, 2009, p. 467-468).

The close connection between leadership styles and organizational architecture is particularly evident in the organizational design of participative leadership among hidden champions. Employees at hidden champions are encouraged to contribute proactively to shaping the company through ideas and creative impetus. This is favored by the tendency toward flat hierarchies and decentralization of decision-making competencies and has a positive effect on the development of innovation within hidden champions (Sorenson, 2000). One advantage of

this adds to the quality assurance of the products. Through the participatory transfer of competencies to the employees, who are also often deployed on site at the customer, the particularly maintenance-intensive, highly complex products of hidden champions can thus be better taken care of. This bridge across a large number of highly trained and specifically educated employees would be difficult to achieve without the adequate decentralized organization and a transfer of competencies.

Hidden champions also differ in their governance structure from other types of firms. Firms are created with the purpose to satisfy human needs. This holds for all types of firms, no matter if large or small, established or new. But, this in turn asks whose needs in particular will be served by a firm. To illustrate this idea, a firm thus can serve shareholders and focus on maximizing profits and value of shares. Contrary to this, firms provide job security, they supply customers with goods and services, they offer opportunities for employees, they create tax revenues and jobs for local communities and also they can help to change for the environmental good. Thus, there is a staggering plurality of aims a firm can pursue (Roberts, 2004, p. 20). Hidden champions provide a clear cut answer to these questions: the interest and needs of all relevant stakeholders has to be considered. Simply because it pays – based on the complementarities provided by these stakeholders: employees, engineers, regional policy makers, customers, clients, suppliers, or investors. Whereas a rather traditional view of corporate governance targets a mere shareholder value thus regarding shareholders as the most relevant and influential stakeholders, hidden champions naturally ask for a broader and more inclusive definition of corporate governance – taking care of all relevant stakeholders and their interests (Audretsch and Lehmann, 2001; Audretsch and Lehmann, 2014).

Firm-specific investments create a hold up problem as stakeholders are reluctant to invest in them due to the absence of perfect contracts. The uncertainty surrounding these investments enables entrepreneurs and managers to prioritize their own interests over stakeholders. To

address this, corporate governance should encompass all stakeholders with firm-specific investments, ensuring a return on their contributions. Identifying relevant stakeholders and their interests is vital for leadership of hidden champion firms (Roberts, 2004).

The long-term horizon of hidden champions' leadership is also reflected in the manager-to-employee ratio. A study by Teuber, Backes-Gellner and Ryan (2016) analyzes mechanical engineering firms in Germany, Switzerland, the UK and US. It shows that while on average one manager controls 26 employees in Germany, 7 employees tie up one manager in the US. The authors argue that in line with the Varieties-of-Capitalism approach, Germany resembles a coordinated market economy. Instead, the US rather appears as a prime example of a liberal market economy. German employees in manufacturing are especially invested and rely on cooperative employer-employee relationships, a specific and coordinated vocational education and intensive training-on-the-job investments. Moreover, the value of specific investments and thus mutual dependency is accentuated especially through Germany's system of co-determination and industry-wide wage agreements. The mutual relationship capital therefore safeguards long-term investments on both sides. On the contrary, the US system calls for a higher control ratio and strong management, as employee protection legislation is weak and employees tend to invest in general (academic education) rather than specific human capital (vocational education) (Lehmann et al., 2019; Audretsch et al., 2021).

The exchange between hidden champion and customers is also significantly simplified by the organizational architecture of hidden champions. The decentralized and flat organization enables technicians and engineers to be given a high level of decision-making authority and thus play a key role in shaping the innovation process from where the technology is ultimately implemented. This allows ideas and insights to be efficiently fed into the innovation loop. Even if fundamental and strategic decisions are made hierarchically and authoritatively at hidden champions, the management style in operations and product development is participative and

uses the deep product knowledge of employees who have often worked in the company for a long time and have even experienced different product generations (De Massis et al., 2016). The organizational architecture is thus focused on their exchange with customers and their deep product knowledge and is used in a complementary way by organizational architecture and leadership style, as elaborated further below.

3.2 Empirical Evidence

The last section has depicted the worldwide distribution of hidden champions and in spite of their worldwide presence, the academic focus on hidden champions took several years to investigate their characteristics and strategies. After several years of strong research effort, this section will now illustrate some snapshots on what we know about hidden champions until recently (Schenkenhofer, 2022). So far, research on hidden champions has mainly focused on their strategy and success factors. Yet, this has been done mainly on a conceptual level. Empirical studies on hidden champions are comparatively rare. In particular, a good number of empirical studies in the field analyze individual country samples in order to identify the success factors and characteristics of a country's hidden champions, such as Voudouris et al. (2000) or Purg et al. (2016). Nevertheless, there are some exceptions which have conducted multivariate analyses or control group comparisons, as Table 3 illustrates. This section is a summary of the more comprehensive literature review by Schenkenhofer (2022).

Compared to table 2 and the key characteristic of hidden champions (presented in section 3.1), most empirical studies elaborate on their innovation activities and their geographical distribution and impact on their macro-economic environment. Regarding a number of characteristics, literature has attained some empirical evidence of the last decades, such as:

- Intensive internationalization (Witt, 2015)
- Incremental and open innovation (Yoon, 2013; Rammer and Spielkamp, 2015, 2019)
- Specific human capital (Audretsch et., 2021)
- Rural endowment (Vonnahme and Lang, 2019; Benz et al., 2021)

While the results from Witt (2015) on the internationalization strategy of hidden champions were presented in section 3.1.1, several studies investigate hidden champions and innovation:

Venohr and Meyer (2007) examine success factors of German hidden champions with regard to their high export success. In particular, they find that 3 different factors are critical for the performance of hidden champions, especially what concerns innovation. The management style of hidden champions is unique and allows family businesses to autonomously develop their own culture. The culture is family-oriented and gives employees of hidden champions a high degree of decision-making freedom. Thus, creating long-term ties within the company and establishing a culture of family trust incentivizes investments in an intense knowledge stock. In addition, hidden champions are particularly focused on their niche, in which they build particularly deep bonds with customers through their technological superiority. Hidden champions are also particularly process-efficient and constantly achieve process innovations, which makes them particularly successful in operations efficiency.

Yoon (2013) examines success factors of hidden champions compared to a control group of ordinary SMEs. Hidden champions follow a high market orientation in their strategy. Their high market initiative is the reason they continuously invest in their innovation activity. They show initiative themselves and pursue a market pull rather than a technology push strategy. In addition, hidden champions show a prominent level of technology competitiveness, which

enables them to exploit global market opportunities. Moreover, they are highly internationalized and constantly seek new markets. In contrast to ordinary SMEs, hidden champions are significantly more international due to their niche strategy and are represented in all relevant global markets.

Rammer and Spielkamp (2015) examine the innovation success of German hidden champions. For this purpose, they form their own sample of hidden champions, as they gain through a top-down sampling approach. They use a broader definition than Simon's, which means that their sample of 1583 hidden champions also include more hidden champions than most other samples. They apply the following criteria to classify companies as hidden champions:

- (1) the company is considered medium-sized as soon as it has fewer than 10,000 employees
- (2) is considered to be globally active if the majority of its sales are generated abroad
- (3) it pursues a niche market approach, insofar as it has a world market share of at least 10%.
- (4) the company must be successful. That is, it must have achieved strong sales growth in the last 5 years, which they specify as 10% above the average for companies in the same industry.

They further derive a control group through propensity score matching of similar SMEs. They reach the control group in which each company has a twin based on number of employees, industry, and introduction of product or process innovation similar characteristics. Their results indicate that hidden champions innovate significantly more than the firms of the control group. They estimate that 81% of the hidden champions have introduced innovations in the last 3 years, whereas the control group only achieves a value of 71%. They conclude that the high innovation

efforts are the basis of their market leadership and technology leadership. On the other hand, the differences between the hidden champions and the control group on the input side of innovation strength are small. This is particularly evident in the expenditures in research and development investments. Rammer and Spielkamp (2015) suggest that hidden champions have advantages over other companies in process management and in the formation of synergies with strategic cooperation partners, which explains their innovation efficiency.

In a second study by Rammer and Spielkamp (2019), they again sample hidden champions using a top-down approach. This time, they broaden their research question and investigate general success factors of hidden champions with respect to their strategy and innovation management. Again, they build a control group to identify specifics of hidden champions. They find that hidden champions seem to not invest more in R&D than other firms, but they use resources more efficiently. Their high specialization and focus on the niche market helps them to innovate more successfully. Through the stage of technology development and strategic networking with cooperation partners and long-term investment in their human capital stock, they achieve greater growth and innovation success than the control group.

Another key characteristic of hidden champions points to the need of specific human capital for niche technologies. This factor, amongst others, was empirically studied by Audretsch et al (2021). They argue that centralized VET systems achieve best to motivate investments in the stock of specific human capital. Audretsch et al. (2021) examine the global distribution of 2690 hidden champions and describe various contextual factors of the institutional business environment and examine how these complement the strategies of hidden champions. In their context-choice model, they distinguish between a number of contexts that are either complementary for niche entrepreneurs like hidden champions, or scalable models like unicorns. They show that such contexts as soft inheritance taxation, dualistic corporate board

systems, civil law regimes, a country's decentralized economic geography and the centralization of the VET system prove complementary to the business strategy of niche entrepreneurs.

Another factor relates to the geographic location of hidden champions. Vonnahme and Lang (2019) examine the innovation activities of German niche world-market leaders in Germany. The study focuses in particular on companies that are located far from agglomeration areas and manage to cope with the more adverse conditions in rural areas. The study investigates how remote hidden champions succeed in being innovative, although their disadvantageous geographical location makes it more difficult for them to access information sources and cooperation partners that are important for innovation. The empirical analysis uses a mixed-method design consisting of a two-stage structure. First, a survey of German hidden champions is conducted, which is then supplemented by individual interviews with representatives of the companies. The results suggest that hidden champions operate largely independently of their geographical location. Above all, they are internationally oriented and generate the largest share of their sales through international sales. For them, geographic location is of minor relevance. Vonnahme and Lang (2019) further typify hidden champions according to innovation activities and geographic location. All types are less integrated into their regional environment and rather rely on translocal knowledge dynamics.

The geographic location of hidden champions moreover has a high importance for local regions. Numerous studies show, e.g., for Germany, that hidden champions are distributed in a strikingly decentralized and rural pattern (Simon, 2009). They are therefore of great significance for individual regions and have a major impact on their prosperity. Often, they even are the largest employers in peripheral areas. Benz et al. (2021) examine the importance of hidden champions for regional development. They show that the concentration of hidden champions per capita in a region has a positive impact on a number of regional indicators, such as regional economic

performance, measured by median income. Regional unemployment rates, trainee rates and regional patent rates are also positively influenced by the concentration of hidden champions.

Other empirical studies analyze the economic performance of hidden champions such as Benz et al. (2020a, 2020b). Benz et al. (2020b) for example study listed hidden champions and the extent to which their hidden champion characteristics are compatible with the capital market. They compare their study of listed hidden champions with the 30 companies in the DAX, Germany's leading stock market index. They identify 99 companies in the CDAX as hidden champions, whereby they work out that the strategy of the hidden champions regarding the factors focus, ambition, future orientation, innovation, and internationalization make them attractive for investors. In contrast, it is not typical for hidden champions to have to comply with reporting standards and to communicate transparently to the outside world. Hidden champions try to remain as independent as possible from external stakeholders and capital markets. The comparisons with the control group also show that they have a higher equity ratio, higher liquidity, and an overall lower beta risk.

Apart from these characteristics, a number of the key characteristics have not been investigated empirically yet and remain a mandate for future research. Though Venohr and Meyer (2007) and Rammer and Spielkamp (2019) conclude from their results that hidden champions are especially efficient regarding their process and supply chain management, the characteristic 'flexible production and manufacturing' still lacks more empirical analysis. Moreover, research needs to test how hidden champions strategically build lasting and long-term relationships with stakeholders. While this has mostly been researched for employees (Lehmann et al., 2019; Audretsch et al., 2021), less work has been devoted to customers and suppliers, e.g. Also, the leadership styles of hidden champions and their impact on stakeholder management and employee commitment has not been investigated empirically so far. Finally, while research has made earnest efforts to analyze the financial strategies of family firms and the Mittelstand

(Vitols, 2001), hidden champions research has devoted less attention the field (Lebedev, 2013). Especially, their solid financial base could prove valuable throughout exogenous shocks, such as the COVID19 pandemic. Therefore, the financial strategy of hidden champions could prove as a resilience factor and help to mitigate capital costs.

4. The Evolution of Hidden Champions

The previous sections presented the concept of hidden champions and what constitutes their key characteristics. Also, we pointed what aspects thereof already find some empirical evidence within the literature. Section 3 builds on that by illustrating the evolution of hidden champion. Before we present that evolution both in a geographical and a historical dimension (sections 4.2 and 4.3), we first illustrate the theoretical foundations of the rise and distribution of hidden champions (section 4.1). The section on geographical evolution then builds on that showing how hidden champions adapted to institutional context arrangements through complementary corporate business strategies. The historic dimension of their evolution grounds on technological developments that shaped new niche markets in their respective time. We present three different historical industrial eras, exemplary hidden champions of these eras and how their technology has corresponded to a newly emerging niche demand.

4.1 The Logic of Hidden Champions: Theoretical Foundations

Why do significant and enduring regional inequalities exist among hidden champion companies within countries and across different countries? Additionally, why do these companies tend to establish themselves in regions where labour and land are comparatively expensive? There are at least two streams in the literature providing answers on questions like these. The first stream

in the literature is called ‘spatial’ or ‘agglomeration’ economics, arguing that economic activities are geographically localized and uneven. The second stream of the literature is called ‘Theory of the firm’, arguing that organizations, and in particular firms, are an essential part of an economy, like markets, and that both, their existence, and location is mainly driven by costs and benefits. Both strands of the literature however are not only closely linked together, there are based on the same theoretical roots, the concept of complementarity. The concept of space, along with related ideas like location, transportation, and land, plays a crucial role in understanding the presence and distribution of hidden champion companies. The location of a company is connected to the feeling of family origin and different types of flows, including the movement of goods, people, production factors, and information (Proost and Thisse, 2019, p. 576) and how these types of flows could be exploited by a firm, the costs and benefits compared to alternative locations. Spatial and regional economics centers its attention on the movement and interchangeability of goods, resources, and production factors, externalities and knowledge spillovers or imperfect competition, the theory of the firm is focused on the costs of transacting and contracting with the owners of these mobile factors like land owners, workers, investors, clients, suppliers and various other economic agents (Foss and Klein, 2012). The interplay of both strands of literature leads to spatial and organizational complementarities resulting in a combination of increasing returns and imperfect competition – and thus competitive advantages of hidden champions.

The concept of complementarity is mainly introduced into the theory of the firm by Milgrom and Roberts (Milgrom and Roberts, 1990, 1995; Roberts, 2004) and made popular in the context of entrepreneurship and small business economics by Audretsch et al. (2021).

Every company faces the challenge of making strategic choices and designing their organization in a dynamic, complex, and often disruptive environment. The process of selecting a strategy is already complex, but when including all the elements of organizational design and aligning

them with the environment, it becomes extremely intricate (Roberts, 2004, p. 32). It is not surprising that strategic management literature has emerged, suggesting that this problem is inherently complex, lacking clear logic or regulations, and requiring an ad hoc, agile, or disruptive approach to navigate the challenging terrain (Levinthal, 1997).

Otherwise, there is ample evidence that some types of firms co-exist, like new ventures, SME and multinational and global corporations (Audretsch et al. 2018; Audretsch et al. 2019), and that within each type of firms some firms are more successful compared to others. Abstracting that firm success is only driven by luck and chance, there must be a logic underlying the success of firm types and successful firms, a fit between certain strategies and organizational designs and the environment. Some strategies and organizational designs align perfectly with each other and the environment, while others have a reasonable fit, and some do not fit well at all. As stated by Roberts (2004, p. 32), there are often identifiable, comprehensible, and predictable connections between environmental factors and the strategic and organizational choices that determine which combinations of choices are likely to succeed and which are less likely. By recognizing these relationships and understanding their consequences, one can navigate the design challenge more effectively. Thus, becoming a hidden champions is not the result of luck, chance and enhancement of the environment, but the result of an organizational design that fits with the environment.

The design problem, which falls under the responsibility of top management, involves the identification and selection of suitable combinations of choices across various dimensions, aiming to establish a cohesive pattern among the choice variables. Thus, leadership quality in hidden champions firms is thus the quality to ensure a consequent application of the coherent pattern as identified but also to challenge the pattern when the environment requires an adjustment. Although the concept that strategy, structure, and environment should align with each other is a longstanding notion, the theoretical background dates back to industrial

organization in economics and Michael E. Porter famously translated the findings into the context of business and management, creating what is since then known as strategic management. What differs from this literature is the logic and rational as well as the insight that only a limited set of variables are of interest, the availability of coherent patterns is limited, and it is not viable to simply mix and match variables without careful consideration.

The fundamental concept behind logic and rationality lies in the mathematical relationships among choice variables, the available choices, and the connection between at least one variable and performance. Achieving a perfect fit between strategy, design, and environment is thus based on the notions of complementarity among choice variables, non-convexity in the set of available choices, and non-concavity in the relationship between choice and performance (Roberts, 2004, p. 33). Complementarity of choice variables, which can be influenced by top management, leads to clear patterns of coherence in design. Non-convexity and non-concavity imply the existence of multiple distinct coherent patterns. However, our primary focus is on understanding the complementarity of choice variables and how and why they can be designed to form a cohesive ‘hidden champion’ pattern (Audretsch et al., 2021).

Complementarity of choice variables requires to consider the interplay between changes in different variables influencing performance. There exists a broad set of choice variables, like prices, quantities, qualities, service levels, financing, product design, degree of internationalization, the allocation of design rights, job design, aspects of culture, to name just a few of them. Many of these variables are changed and modified without considering that a change of the specific variable also alters other variables which should then be modified or adjusted too. Simply because choice variables are not independent but either complements or substitutes (Roberts, 2004, p. 34).

Complementarity between two choice variables occurs when an increase in one variable enhances the benefits or returns associated with increasing the other variable. From an economic perspective, the incremental return of one choice variable (by increasing it by one unit) boosts the level of any complementary choice variable. Consequently, if one part of a complementary pair is implemented or expanded, it becomes more appealing to introduce or enhance the other part. On the other hand, choice variables are substitutes if increasing one diminishes the desirability of increasing the other.

The scope of choice variables within which complementarity can extend is extensive, leading to a wide range of intricate patterns. Audretsch et al. (2021) find complementarities among a strong focus on niche markets and internationalization, workplace and human resource management, leadership and governance, incremental product innovation and in particular rural sourcing and regional embeddedness in a large sample of hidden champion firms. They show that hidden champions represent one coherent pattern of choices over a set of variables, while firms of the Silicon Valley-Model of entrepreneurship represent another coherent pattern of variables. The existence of complementarity relationships among choice variables provides structure and leads to distinct patterns, where all the complementary variables are typically pursued together and at similar levels. The context variables as studied by Audretsch et al. (2021) are illustrated within the next section.

4.2 A Geographical Roadmap

According to the complementarities of the institutional environment, economies vary in their ability to attract and retain hidden champions, as illustrated further above. Thus, this section examines the evolution of hidden champions with regard to their spatial distribution (figure 3). The path-dependent evolution of different institutions is responsible for the spread of different

manifestations of entrepreneurship. Thus, this section is based on the article by Audretsch et al. (2021), who have already examined these factors in more detail. They show how the geographic spread of hidden champions unfolds along to different context factors:

- (1) Board Systems
- (2) Legal Origin and Capital Markets
- (3) Inheritance Taxation
- (4) Geographical Economics
- (5) System of Vocational Education

4.2.1 Board Systems

Corporate governance systems differ around the world in their role of representing the interests of owners. In addition to the legal regime differences examined in the seminal work of La Porta et al. (1998), the nature and function of board systems differ worldwide. Basically, one can distinguish between monistic board systems (as in the US or UK) and dualistic board systems (such as in Germany):

In monistic system, the

- Board is elected by the general meeting
- Executive board members and non-executive board members are distinguished
- Executive board members manage the business of the company and thus correspond to a large extent to the board members of the dualistic supervisory board system

- Non-executive board members, on the other hand, exercise a control and monitoring function outside the company. They are not employees of the company

In contrast, the tasks are distributed differently in the dualistic system:

Here, the

- Board conducts business of the company
- Supervisory Board advises, supervises and controls the Board of Directors
- Nature and purpose of the general meeting of all shareholders is regulated in Germany, for example, in the Stock Corporation Act and is the central body of the AG and Kommanditgesellschaft auf Aktien (KGaA)
- Shareholders gather at the Annual General Meeting to express their interests; the Annual General Meeting is normally convened annually. In this context, the General Meeting has a number of tasks:
 - Election of the Supervisory Board
 - Discharge of the Management Board and the Supervisory Board
 - Determining the appropriation of profits
 - Discuss and decide on amendments to the Articles of Association
 - Appoint auditors
 - Capital increases and reductions

- Management Board to report on business decisions and give account of its actions
- The Annual General Meeting is chaired by the Supervisory Board in this respect

In summary, the two systems differ fundamentally from each other (Rouyer, 2013). While in the dualistic system (also two-tier system) the management board and supervisory board are separate entities, in the monistic system (also one-tier system) they are combined as supervision and management in the board of directors. A special feature of the German system is that companies subject to the German Codetermination Act (Mitbestimmungsgesetz) must have an equal number of members on the supervisory board, i.e. equal numbers of employee representatives and shareholder representatives. The literature shows (Pellegrini and Sironi, 2017; Bezemer et al., 2014; Millet-Reyes and Zhao, 2010) that family businesses find it easier to assert their influence in dualistic systems. By having a majority on the supervisory board, they can steer the company from there in a strategically protected position. Audretsch et al. (2021) show that countries with dualistic supervisory board systems are complementary to the spread of hidden champions, most of which are family-owned.

But unfortunately, the strict division into monistic and dualistic is often not possible. The dichotomous classification of monistic and dualistic systems is particularly difficult in countries where there is an option to choose the board structure, as in Belgium. In the SE (*Societas Europaea*), it is also possible to choose between the two systems, which means that a uniform separation by country is not strictly feasible.

Depending on the system, this results in different decision-making rationales of the participating agents (Hillmann and Dalziel, 2003; Corbetta and Salvato, 2004; Jungmann, 2006). While in monistic board system the common information base favors faster decision

making, this also tends to allow better adaptation to a more dynamic business environment. The chairman is usually also the CEO and can make largely autonomous decisions about corporate strategy. Employees have no influence on strategy, which is different especially in dualistic systems with incisive co-determination rights for employees (as in Germany or Sweden). In Anglo-American one-tier systems, the central stakeholders are therefore initially the shareholders; in two-tier systems, such as in Germany, employee representatives have a strong influence that should not be neglected. The establishment of an employee-friendly system has a long tradition in Germany. It began with Otto von Bismarck's social legislation reforms in the Wilhelmine Empire. Driven by a strengthening Social Democracy in Germany, the leadership of the empire was driven by fears be overthrown. The political leadership of the conservative monarchs was only secure as long as the population stood behind the imperial leadership. To forestall an overthrow, Bismarck introduced the dualistic supervisory board system with the General German Commercial Code Act in 1870, along with social legislation that was groundbreaking for the time (including mandatory accident and health insurance). The great institutional revolutions after both world wars led to social reforms after the abdication of the Kaiser in 1918, as well as after the end of the Third Reich in 1945. Both times, the conservative forces in the country tried to avoid a possible and threatening socialist revolution, which were likely both times due the sudden power vacuums. Thus, both times further social legislation was initiated to appease socialist forces in society.

4.2.2 Legal Origin and Capital Markets

The capital market system is another key reason hidden champions feel particularly comfortable in certain institutional arrangements. While some economies are characterized by market-based systems (e.g., US, UK), other countries (e.g., Germany) have developed bank-based systems,

which are reflected in the different development of capital markets such as equity and venture capital. The starting point for the different development lies not only within formal institutions such as legal origin, but also within cultural differences such as institutional trust and risk attitudes.

The USA is regarded as the prototype of a market-based and shareholder-oriented system, which has favored the spread of Silicon Valley entrepreneurship (Kuratko and Audretsch, 2021). The basis for this is sufficient shareholder protection, which increases the incentives for investors to invest in capital markets. In several landmark articles, La Porta et al. (1998) show how capital markets have developed differently around the world. While common law countries (USA or England) have larger and more liquid capital markets, other countries such as Germany (civil law origin) have favored comparatively smaller markets and substitute arrangements. La Porta et al. (1998) attribute this primarily to a country's legal origin. Common law systems like in the US or UK tend to be better at protecting shareholders and prosecuting overreaching by corporate insiders. Thus, the incentive of shareholders to invest in the capital market is greater, as they can actually internalize more of the returns. In contrast, bank-based systems focus on banks as the main intermediary and provide patient capital to family businesses as long-term partners. Due to the lower level of shareholder protection in civil law countries, investors are more reluctant to participate in the capital market. Smaller and less liquid traditional capital markets are the result. La Porta et al. (1998) further state that common law-based systems have more dispersed share ownership. In civil law-based countries, ownership appears in much higher concentrations. Families can thus create a substitute by holding concentrated shareholdings and, as large blockholders to improve control over managers. Concentrated shareholdings imply that they are subject to fewer agency conflicts, which arise among shareholders in the case of dispersed ownership. However, it must be added that this argument is only valid to the extent that the agency cost advantage is not eaten up by further costs from

internal family conflicts. Nevertheless, Audretsch et al. (2021) show that the traditionally more concentrated shareholdings in civil law countries have a complementary effect to attract and retain family businesses such as hidden champions.

Moreover, the different capital market structures have further consequences for corporate financing in the respective economies. Black and Gilson (1999) suggest that venture capital financing depends on liquid traditional capital markets. If innovative and fast-growing startups are financed through venture capital, liquid venture capital markets also require liquid equity markets to facilitate IPO exit probability and speed. Venture capital offerings in the U.S., where venture capital also originated, still significantly outpace offerings in Europe, even though Europe has narrowed the gap over the past decade. The structure of the capital markets is thus a major factor why high-tech entrepreneurs have been able to develop better in market-based systems (Vitols, 2001; Levine, 2002). The presence of high venture capital assets is an expression of a different entrepreneurial culture, which also manifests itself culturally and is one factor explaining the divergent entrepreneurship manifestations across different institutional contexts. The second major argument on the divergence of capital markets the resulting opportunity for entrepreneurial financing is thus based on cultural factors. As section 4.2.4 on geographical economics describes, the U.S. has managed to create conditions that favor high-tech entrepreneurs through cluster policies that spur venture capital investments.

Research has examined factors that promote an entrepreneurial climate in a society, such as fear of failure, second chancing or social stigmatization, and thus support the emergence of high-tech entrepreneurship (Arenius and Minniti, 2005; Armour and Cumming, 2008). The entrepreneurship literature, on the other hand, argues that Germany lacks an entrepreneurship-friendly climate with regard to this cultural dimension. In this sense, a lack of institutional trust is often cited as a reason why capital markets developed more slowly and a start-up culture only began to develop much later within Germany. Recurrent sovereign crises, currency and inflation

crises led to the repeated devaluation of capital in Germany and investors lost institutional trust in currencies and investments. The underdevelopment of capital markets in Germany thus also has its origins in a crisis of confidence in the state and its institutions in Germany in the 20th century.

But if both world wars and the economic malaise in the Weimar Republic disillusioned German investors, how did capital markets compare prior to that? Germany experienced a time of remarkable stability, prosperity, and economic growth for nearly half a century during the German Reich era (1866/1871-1918). Did the consolidating institutional environment and economic spirit eventually result in a more vivid and solid capital market? A number of sources attest to the solidity of the German capital market before World War One. Germany's industrialization in the second half of the 19th century accelerated rapidly after the founding to the German Reich in 1871. The shift of Germany's sectoral landscape shifted from agrarian to industrial and the shared economic area of the united Reich, a new common currency and newfound entrepreneurial spirit and general spirit of optimism after national unification resulted in boom of stock market IPOs. A total of 6534 new joint-stock companies of 9.9 billion marks investments were created between 1871-1910 alone (Korolenko and Baten, 2006). As the sharp rise led into a speculative bubble (so-called *Gründerkrach*, which stands for the economic depression after the market bubble had burst) many of them disappeared in the following years. Krahnen (2004) estimate the number of solid firms to around 1200 in 1914. At the same time, the New York Stock Exchange listed only ca. 600. Before Germany's century of catastrophes began with World War I, "*German equity markets were among the most highly developed in the world*" (Nowak, 2001, p. 35). This view is shared by Krahnen (2004, p. 506) who conclude in their analysis on the financial architecture of the German bank-based system that "*before the First World War, the stock market capitalization as a percentage of GDP was more important in Germany than in the United States*". They furthermore found a similar picture when

comparing the mere number of companies listed on a stock exchange, estimated as percentage of the given population. In 1913, the number of listed companies was 6 times higher in Germany compared to the US. Thus, a conclusion could be that the diametrically different picture of the capital markets in Germany before and after the great crises of the 20th century indeed stems from destroyed institutions and therewith associated lack of institutional trust.

4.2.3 Inheritance Taxation

In addition to capital markets, tax regimes have a major influence on incentives for economic activity and are thus a central steering mechanism of public policy. A vital component here is inheritance taxation of personal and business assets. Research suggests that inheritance taxation has a major impact on the development of a country's business structure. Economies differ significantly in whether inheritance is taxed heavily, lightly or, as in some countries, not at all. Table 4 lists some countries that have abolished inheritance tax altogether. Tax regimes that strictly tax inheritance have higher tax rates and fewer opportunities for tax exemption. On the other hand, other tax regimes are rather lax and either tax low, know numerous possibilities for exemption or do not levy inheritance or gift tax anymore. In China, an inheritance tax has never been levied. For family businesses, the taxation of family assets often implies a high burden, which in many cases can lead to divestments of company shares (Nowak et al., 2006; Ellul et al., 2010; Carney et al., 2014; Tsoutsoura, 2015; Jestl, 2018). In a survey conducted by the Ifo Institute, 43% of the family businesses surveyed said that they would have had to sell the business at the time of generational transfer if there had been no exemption provision. 66% stated that they would have had to reduce investments without an option for exemption, and another 52% stated that they would have had to reduce jobs (Ifo, 2014). The motivation to bring further non-family owners into the company through an IPO is increased by high inheritance

taxes. Alternatively, the already challenging business succession is solved by the inheritance tax by dissolving the company before death or selling it if an investor can be found. Critics of the tax in Germany argue that the levying of an inheritance tax only marginally increases the tax revenue of the state as a whole (approx. 6%), but on the other hand places a heavy burden on the family entrepreneurs of the German Mittelstand. Advocates, on the other hand, see the inheritance tax as an important contribution to social redistribution and argue that the transfer of wealth is not matched by any effort.

In Germany, an inheritance tax was first introduced as a bill in 1906 under Chancellor von Bülow. It was part of the law (annex 4) to improve the ailing state finances, which was already reflected in its name: *Gesetz, betreffend die Ordnung des Reichshaushalts und die Tilgung der Reichsschuld* (translated: *Law Concerning the Order of the Imperial Budget and the Repayment of the Imperial Debt*). The newly established welfare state of the Wilhelmine Empire, the colonial war in German Southwest Africa and the vigorously pursued expansion of the Imperial Fleet caused the financial needs of the Empire to skyrocket. In the Law for the Improvement of State Finances, the higher financial resources were to be improved by a series of new consumption taxes (e.g. on tobacco, beer and liquor) and the introduction of a uniform inheritance tax. The fierce debates, which were not only fought in Parliament but understandably also in public, polarized the domestic political mood enormously. First and foremost, the Conservative parties (and their industrialist supporters), large landowners and smaller farmers saw inheritance taxation as creeping expropriation and warned vehemently against the uprooting of society's sense of family. As one of the central pillars of the economic upswing since the founding of the empire, it was above all the many family businesses of the uprising Mittelstand that had ensured that the young welfare state could be financed. In the Reichstag, the reform bill for the *Reichsfinanzreform* (reform of state's finance system) was discussed for years and repeatedly put on the back burner. Its passage in 1909 led to the

introduction of the inheritance tax and the end of Reich Chancellor von Bülow's chancellorship. While conservatives (German Conservative Party, German Reich Party) and the National Liberals rejected the law, von Bülow's reform proposal then was also rejected (only the SPD and the left-liberal *Freisinnige Volkspartei* were in favor). The reform was subsequently adjusted and significantly weakened, so that conservatives and large landowners were significantly relieved. Extensive reforms, such as those in 1922 (Erzberger's financial and tax reforms) or in 1955 and 1974, led to numerous adjustments in taxation. In an international comparison, however, inheritance tax is considered to be rather soft and one of the reasons why family businesses in Germany could be inherited particularly well over many generations. Even in the current reform of 2016, there are options for exemption from the tax burden. However, in the discussion about the importance of inheritance tax and the continued existence of Germany's small and medium-sized businesses: it is crucial to distinguish between different groups. Of the 99% of companies in Germany that belong to the SME sector, there is a wide range in company sizes and operating assets. The current German inheritance tax law distinguishes between three size categories, for which various exemptions apply: up to €26 million in business assets, €26-90 million and over €90 million. While the vast majority of family businesses in Germany fall into the first category and have to expect softer taxation or no taxation at all, from €90 million of business assets valuation onwards no exemptions are possible, unless one can prove that half of the net cash assets are not sufficient to pay the tax liability (*Verschonungsbedarfsprüfung*). In this case, there will be a complete exemption of the tax burden. If the net cash assets are sufficient, no exemption is possible. Most hidden champions fall into this third category. It is thus clear that the tendency of the 2016 reform to increase the tax burden on large family businesses could exacerbate the succession problems of German hidden champions. A simulation calculation by the Center for European Economic Research (ZEW) shows that the situation for large family firms in Germany could deteriorate

dramatically as a result of the 2016 reform. In an international comparison of 18 OECD countries, Germany ranks second to last in the strength of taxation of its family businesses. The sample calculation used a model company with 210 million annual sales, which corresponds to large family businesses such as hidden champions (Stiftung Familienunternehmen, 2021). And as Audretsch et al. (2021) conclude, current tax rates explain little of the currently observable prevalence of entrepreneurial manifestations. Entrepreneurial manifestations reflect decades of development and institutions evolving along path-dependency. Thus, it becomes clear that only a long-term view of tax systems can explain an impact on economic activity. And in this respect, the German inheritance tax law has tended to be rather soft by international standards. How the current and any further reforms will affect the continued existence of small and medium-sized enterprises and, in particular, hidden champions, remains up for debate and future research.

4.2.4 Geographical Economics

Modern communication technologies and a drastic reduction of transportation costs enable the easy and fast establishment of global markets. No matter how far away companies and consumers or suppliers are, a globalized world brings them close together. Does location therefore play a subordinate role? Does it no longer matter where economic activity is carried out? Michael E. Porter, on the other hand, describes the high significance of agglomeration effects and economic activity in clusters: *"Clusters are geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition."* For Porter, they include *"suppliers of specialized inputs such as components, machinery, and services, and providers of specialized infrastructure."* They extend downstream *"to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies, or common inputs. Finally, many clusters include governmental and other*

institutions-such as universities, standards-setting agencies, think tanks, vocational training providers, and trade associations-that provide specialized training, education, information, research, and technical support." (Porter, 1998, p. 78) They combine concurrent economic activity and attract capital, such as human or knowledge capital. Due to their proximity, they enable knowledge spillovers. Thus, all actors potentially benefit from each individual's investment in acquiring new knowledge. Moreover, high labor mobility of workers and CEOs can be observed in clusters such as Silicon Valley, expressing knowledge transfer through spatial proximity. Knowledge clusters feed their economic activity from the R&D efforts of different actors such as private or public research institutes and companies (Porter, 1998). It is the spatial proximity that decisively catalyzes the interaction of the different actors. The fact that the actors span a common institutional space allows policies to specifically stimulate economic development and growth, which would incur significantly higher transaction costs in cross-border interactions. Although older clusters were mostly linked to commodity occurrences and thus attracted the location-based clustering of economic activity of the same kind, modern clusters such as Silicon Valley have emerged primarily through the proximity to universities and investments of public policy (such as the U.S. Department of Defense in the case of Silicon Valley). Many of the companies (e.g. Hewlett-Packard, Xerox PARC or SAP) emerged in the Stanford Research Park which was founded in 1951 at the instigation of Stanford University and the City council of Palo Alto. The complementary effect between high-tech startups in need of financial support attracted venture capital companies (offering financial resources) and vice versa. All in all, clusters allow companies to increase productivity by clustering resources and competencies. Through joint research projects or external effects such as knowledge spillovers, innovation efforts are accelerated or even created in the first place.

For hidden champions, industrial clusters such as those described by Porter (2000) play a subordinate role. Their business models are usually so highly specific that the ability to absorb external knowledge is limited, which means that geographical proximity to other companies plays a smaller role than for the unicorns of Silicon Valley. Nevertheless, clusters of hidden champions can be observed in some regions (Simon, 2009). These industry clusters are based on the strategic location of hidden champions in order to exploit locational advantages. These locational advantages usually result from natural resource deposits, which established certain product markets, or the settlement of core markets around which supplier companies strategically positioned themselves. One example of this is the glass production and processing cluster in Zwiesel, which is home to Zwiesel Kristallglas AG, among others. A decisive reason for this was the enormous supply of wood, which has been necessary as a source of energy for the production since the 14th century. There are also some automotive supply industry hidden champion agglomerations around Stuttgart, which settled close to the large automotive companies in Stuttgart and the surrounding area (such as Mahle, Eberspächer, Mann+Hummel or Recaro).

Hidden champions actually might benefit from cluster agglomeration and spillover effects (Simon, 2009). Still, their distribution is rather decentralized and only some of them benefit from cluster effects. Unlike unicorns and other high-tech companies, 66% percent of hidden champions are located in rural areas (Simon, 2009), i.e., in locations where fewer than 50,000 people live. Regional economics is a branch of economics that deals with the spatial organization of economic activity and the use of resources, such as the connection of companies as labor and capital markets. It examines the requirements and conditions of locations and how different types of firms strategically adapt to them. Regional economics examines why different forms of organization are superior to others in their ability to adapt, depending on the context. In many respects, rural areas are initially considered a locational disadvantage because they are

cut off from most capital markets and are thus undersupplied in their ability to provide actors with economic resources. Hidden champions, however, are mainly located in rural areas, as evidenced by various articles and data samples on hidden champions: such as Voudouris et al. (2000) for Greece, Simon (2009) and Schenkenhofer (2022) for Germany, or Muñoz et al. (2017) for Spain. This rural concentration is noteworthy. At this point, Simon often emphasizes the contrast of rural distribution and high internationalization through pointing to the curiosity that hidden champions from small towns such as Windach (Delo GmbH & Co. KGaA, population 3844) or Gosheim (Maschinenfabrik Berthold Hermle AG, population 3802) are able to serve world markets and derive up to 80% of their sales from export. Hidden champions are apparently able to serve world markets and produce highly technological and knowledge-intensive goods despite their often-rural location. How do they manage to do this? Rural areas are usually inferior to urban agglomerations in their access to supplies of capital, such as financial or human capital. As section 3.1.6 shows, hidden champions succeed in capitalizing on rural settlement. The rural location often makes them the sole or largest supra regional employer. Rural areas also ensure that employees are dependent on alternative employers, which also promotes high employee retention among hidden champions. The low spatial agglomeration also plays a subordinate role for their technology development, since their innovation efforts are so highly specific that potential spillover effects play a subordinate role (Audretsch et al., 2021).

4.2.5 System of Vocational Education

Another factor for the spread of hidden champions is the type of human capital that a society provides. Lehmann et al. (2019) and Audretsch et al. (2021) show that systems that centralize education have advantages in reducing underinvestment in the stock of specific human capital of employees. However, specific human capital is of high importance for the highly specialized

technologies of hidden champions (Lazear, 2009; Jahn, 2018). The dual vocational education system in Germany is famous worldwide and enjoys a high reputation.

Today's vocational training system in Germany can be traced back to the organization of crafts in the Middle Ages. Alongside agriculture and trade, crafts were the third central occupational group (Greinert, 2004). Craftsmen traditionally belonged to the lower social strata and not only had little prestige, but also comparatively little representation of their interests. In order to better represent their influence on political and social processes, they united in guilds, especially from the 12th century onward. They organized common interests and organized the training of apprentices, thus deciding on their admission to the profession. In addition to standardizing apprenticeship content, they also guaranteed quality standards through examination procedures. In particular, the guilds regulated the respective division of a craft into three parts: master, journeyman and apprentice. The master supervised the management of the craft enterprise as owner and trainer and was authorized to issue instructions to the journeymen and apprentices. The apprentice was trained by the master and had to pass an examination to become a journeyman.

Thus, it becomes clear the foundation of today's vocational training system was forged in its structured and centralized form already centuries ago. It has a long both cultural and regulatory tradition. The education system is based on the principle that not just a state authority organizes the school system. Rather, the experience and expertise of the master teachers (instructors) crucially shapes the training. In addition to attending a vocational school, apprentices work in a company (dual system). This was different in the Middle Ages when apprentices did not attend school. Apprentices of today are provided with proper employment contracts and while apprentices still had to pay apprenticeship wages for their training until 1969 (but also commonly lived at their master's home), they receive a fixed working wage nowadays. They attend vocational school a few days a week and are exempt from working in the company. Or,

in some subjects, the tradition has been established of alternating between work in the company and vocational school on a weekly basis. The chamber of commerce nowadays is a direct successor of the organization of guilds and organizes the apprenticeship and certification. Dual education systems can also be found in other countries. Thus, training systems have begun to form early in such countries, where early transnational trade relations were established. Examples include Norway, Sweden and Denmark, as well as the Netherlands and Luxembourg. In other national regimes, however, apprentices learn their trade exclusively in vocational schools (e.g., France) or work exclusively in companies (e.g., USA). Craft enterprises in the Middle Ages were already characterized by a high degree of specialization and differentiation, and thus a high degree of attachment of journeymen to their apprentice masters. With the burgeoning industrialization, however, the purely experiential knowledge of the master apprentice reached its limits, and the onset of technologization demanded increasing theoretical skills, which gradually established the duality. Scientific inventions gave rise to ever new product branches and manufacturing techniques, which crafts were subject to rapid change. As a result, especially in the 19th century, training schools were increasingly founded, although attendance was initially not compulsory. Compulsory vocational schooling was not introduced until 1938.

Apprentices were often elevated to journeyman status with debauched rituals after successful completion of their journeyman examination. A great tradition in this context is the *Walz*, which was mandatory in many guilds for apprentices after completing their journeyman's examination. It was often a mandatory prerequisite for the master craftsman's examination. After completing their apprenticeship, they were supposed to go on the road and get to know new regions and customs of other cultures. Since a master craftsman's examination was accompanied by far-reaching privileges and high responsibilities, the *Walz* had the goal of expanding journeymen's life experience. Meanwhile, the UNESCO has even included the *Walz* in the register of

intangible cultural heritage. The wandering journeyman visited new towns to ask for work in workshops and stayed there for up to a year to earn his living. Due to the lack of language skills, the *Walz* was often limited to the German-speaking area, and the journeymen usually stayed in hostels and inns. While the meaning of the *Walz* gained largely after the 2nd World War and found a true rebirth, the tradition of the *Walz* perished in the course of the 1970er years and became a rarity – and if at all was accomplished only for a shorter time span. The tradition of the *Walz* still shows the value and prestige that apprenticeship training has in countries like Germany. As an institution, apprenticeship is still deeply rooted in the culture of Germany and a firm foundation in the provision of complementary human capital for its many SMEs and hidden champions.

4.3 A Historical Roadmap

While the geographical distribution depicts just one aspect of the hidden champions' rise and evolution, another facet of their evolution addresses their historical embedding. Thus, this section presents the evolution of hidden champions in different industrial eras. We present some exemplary hidden champions more in detail through a number of case studies and assign them to central eras in the evolution of hidden champions (pre-industrialization, high industrialization, post-industrialization). This temporal distinction allows us to retrace different era and technology stages. It allows us to understand how niche markets emerge and what developmental steps hidden champions have taken in history. The company analysis illustrates the different paths that niche market leaders have pursued and how they have managed to persist over the centuries (Audretsch et al., 2018; Berghoff and Köhler, 2019). First, this section presents the main technical developments in an industry and then shows how niche companies have emerged from there. Table 5 gives an overview of the different eras and the respective hidden champions that we present in the following sections. Figure 4 provides an overview of the various historical eras and the different key industries.

The figure demonstrates the evolution of key technologies and some of their most notable inventions. The technological breakthroughs most often were conducted by mass-market pioneers that founded or transformed whole industry segments. Niche markets then often emerged through the specialization refinement of technologies that gave opportunities for niche markets to manage parts of the value chain. The figure restricts to evolutions that led to the raise of niche markets. Pre-industrialization especially witnessed huge changes in the steel & iron industry through invention of the steam engine or the puddling method. During Western European industrialization, foremost the industries of chemical & pharmaceuticals, mechanical and electrical engineering rose to prominence. In fact, they were the major pillars of industrialization for the Western world and to this day are among the key industries of hidden

champions (Audretsch et al., 2018). Notable inventions include the dynamo-electric principle or the Otto engine. Without these inventions, the electrical engineering niches of Hella Hueck or Kostal would have been impossible. In a post-industrialization era, computer inventions in the field of software & ICT allowed for the emergence of new niche markets such as computer-based medical engineering applications (Brainlab).

4.3.1 Pre-Industrialization: Steel Industry

Alongside the textile industry, the steel industry was pioneering for Germany's industrialization. German industrialization took place from 1840, around 70 years later than in England. The production of steel and iron already started many years before that and laid the grounds for steel and iron producers already centuries ago. Germany's industrialization was driven primarily by the increasing demand for steel, which was needed for inventions such as the railroad required, as well as for new types of machinery in the burgeoning industrial factories. A decisive factor here is the multiplier resulting from technological developments and the explosion of demand from the various industries, which complementarily had stimulated all other industries. Through scientific knowledge milestones in medicine and pharmacy on the one hand, and advances in hygiene on the other, infant mortality fell enormously during the 19th century. In the period between 1816 and 1871, the states in the German Confederation experienced a tremendous population explosion. This placed completely new demands on the agricultural and textile industries. The industries that dominated until well into the 19th century could hardly keep up with their production, especially since the new population masses had to be fed and clothed. Inventions in agriculture such as engine-driven machinery and artificial fertilizer enabled rapid increases in crop volumes and at the same time increased the demand for steel and iron for the machinery used. The same was true for the textile industry, which was able to achieve high

production increases mainly due to key inventions such as the mechanical loom. Figure 2 also summarizes key technical innovations in the central industries of German industrialization. Fundamental to industrialization was initially the invention of the steam engine, which made mass production possible in the first place. Then, however, the chemical industry in particular benefited from the drastic increase in demand for textiles and fertilizers.

Prior to that, the rapid increase in demand for steel and iron is particularly evident in the expansion of the railroad in Germany. The increase in demand and facilitated increase in intra-German trade due to the customs union, caused the demand for fast goods transport in Germany to increase rapidly. Thus, railroads in Germany not only catalyzed inter industrial trade across all industries but provided enormous demand for iron and steel for the construction of tracks and wagons themselves. Table 6 shows the expansion of railroads in Germany over time, figure 5 the increase in production of coal and steel. The enormous increases in demand for steel and iron drove the industry to constantly develop new technologies and new process methods, which significantly increased the efficiency and cost-effectiveness of production. A key factor here is that steel and iron are very similar metals in composition. Steel contains up to 98% of iron and has only one carbon addition in its alloy, which turns the iron into steel. However, for centuries the development of steel and iron has also been driven primarily by government investment in the military and war industries, as steel has long been a key element in the armaments industry. In particular, the inventions of cannons and firearms fueled the demand for steel. Finally, a revolution came about through the invention of the blast furnace, which made it possible to heat iron and coal mixtures to previously unheard-of levels. The cast iron that could now be produced also had the advantage that it could be easily cast into various shapes. In particular, smelting with coal, which had been discovered in England, was able to unleash new productivity potential. For this purpose, the hard coal was roasted before melting, which made it possible to keep the heat up longer. This enabled the production of finer pig iron. The

unprecedented increase in demand for coal was met by new mechanical mining methods in opencast mines. The steam engine made it possible to drain new production shafts and also to excavate deep-lying coal layers. Coal mining areas such as the Ruhr region in Germany thus rose to become major industrial centers in Europe during the steel revolution. Decisive development steps in the production of iron were the puddling process, the Bessemer converter and finally the Siemens-Martin method. In Germany, the first Siemens-Martin furnaces went into operation Alfred Krupp's plant in 1869.

While the high-industrialization began in the 1840s in Germany, the first producers of iron and steel were founded many centuries before that and helped to process the technology development from an early stage on. The niche firms of the steel and iron industry rank among the oldest family firms around the world, and still are in existence today, such as the Annahütte, Isabellenhütte or William Prym.

Annahütte

The origins of Annahütte in Hammerau near Ainring in the Berchtesgadener Land district date back to 1537, when permission was first obtained to mine and process iron ore. Thus, the Annahütte is one of the oldest world-market leaders in Germany. Since the middle of the 16th century, weapons and sheet metal, screws, nails and wires were finally manufactured. The war economy helped Annahütte to grow steadily, especially in the 17th century. Significant technical innovations warn in the further course of the company's history, especially the transition to a cast welding furnace heated with peat, which was used since the middle of the 19th century. The Siemens-Martin technology was installed in the Annahütte only in 1945 and became the basis for its own steel production. Today, Annahütte employs about 400 people and supplies mainly the automotive, chain and tool industries. Other areas of application include anchor, formwork and geotechnical engineering. Since 1975, Annahütte has been owned by

entrepreneur Max Aicher. Annahütte is famous for their alloyed and unalloyed round steel in the carbon and engineering steel segment, and European market leader in the diameter range from 12 to 14 mm.

Isabellenhütte

Even older than the Annahütte is the Isabellenhütte, which was founded in 1482. Isabellenhütte Heusler is located in Dillenburg and was founded as a copper smelter. The company is also one of the oldest world market leaders in Germany in the field of low-resistance precision and power resistors, which are used in the automotive and electronics industries. The plant has 986 employees today and is owned by the Heusler family since 1827, with the family still running the company in the form of Felix Heusler. Isabellenhütte became known primarily for the Heusler alloys, which were discovered by Fritz Heusler, the director at the time. Fritz Heusler's son, Otto Heusler, published the discoveries in cooperation with the University of Marburg. Today Isabellenhütte is one of the world's leading manufacturers of thermal and resistive alloys and low-impedance precision and power resistors.

William Prym

The William Prym Group was founded in 1530 as a metal manufacturing company by goldsmith Wilhelm Prym in Aachen, Germany. Today, the company is based in Stolberg. First product segments were mainly the production of brass and copper. In the 19th century, the company focused more and more on finished products made of brass, iron and steel and quickly moved into large-scale industrial production. From then on, the company's product range also included screws, needles and threaders. Among other things, the company became famous for the snap fastener. Today, Prym produces mainly snap fasteners, pins and safety pins. Prym employs over

3300 people and was continuously managed by members of the Prym family until 2005. Today, Prym is still a market-leader for buttons and snaps, mostly used in the fashion industry.

4.3.2 High-Industrialization: Electrical engineering

Another core industry of industrialization was electrical engineering, which, like all other core industries of industrialization, are also core industries of the then and now hidden champions. The electrical engineering accomplished essential technological inventions in the course of the 2nd half of the 19th century, which revolutionized the economy and the social life. First and foremost, the development of the dynamo by Werner von Siemens in 1866 was groundbreaking. From then on, electric current could be produced by a simple rotary motion through Siemens' generator. Through the dynamo-electric principle, a magnetic field is maintained by the generated current itself. Werner von Siemens succeeded in feeding part of the generated current back into the electromagnet to enhance its magnetic effect. The invention was groundbreaking for street and car lighting and finally the invention of the *electric railroad* by Siemens himself (1879), which from then on shaped the cityscape of large German cities.

In addition to Siemens, Emil Rathenau led the way in the development of electrical engineering, founding the *Deutsche Edison-Gesellschaft für angewandte Elektrizität* (German Edison Company for Applied Electricity) in Berlin in 1883, which was transformed into the *Allgemeine Elektrizitäts-Gesellschaft AEG* (General Electricity Company) four years later. AEG was a leader in the manufacture of incandescent lamps, electric motors, and generators, and pioneered worldwide electrification. With the differential arc lamp of 1878, Siemens achieved a major milestone toward the worldwide illumination of major cities. Gradually, electric light replaced the initially used gas light in the form of the arc lamp, which was later replaced by the filament lamp. The differential arc lamp uses automatic regulation of the carbon pins, which made it

possible to achieve a much longer service life and reduce the intensity of maintenance, since the arc lasts longer and does not turn off due to the rapid burning of the electrodes, as in the case of the carbon arc lamp.

Communications technology also saw groundbreaking developments in the form of telegraphy and later telephony. Werner von Siemens founded the *Telegraphische Bau-Anstalt von Siemens & Halske* in Berlin in 1847 and was able to achieve technological innovations with the new pointer telegraph, which at that time already expanded the company into one of the world's largest electrical companies. A few decades later, the physicist Ferdinand Braun succeeded in designing the first transatlantic radio transmission, for which he was awarded the Nobel Prize in Physics in 1909. Telephony was invented by Phillip Reis, also a German physicist. He was the first to succeed in transmitting sounds electronically and called his developed item *Telephon* (1861). Siemens took up the technology but used a horseshoe magnet instead of a rod magnet and was thus able to significantly improve speech intelligibility. The triumphant advance of the telephone thus began with the Siemens telephone, introduced in 1877, which was to revolutionize mass communication. While electrical engineering was revolutionized primarily by large companies such as Siemens and AEG, numerous smaller companies such as Hella Hueck, Kostal and Brose developed new niche markets in the shadow of the large corporations, mainly inspired by the invention of electrical light, electric motors, generators and the dynamo-electric principle.

Kostal

Kostal GmbH was founded in 1912 and is a family business from Lüdenscheid. Kostal GmbH is the world- market leader for various products in electrical engineering and primarily supplies the automotive and photovoltaic industry electronics. In automotive electronics, Kostal primarily develops products for vehicle body electrics, such as steering column modules, operating elements and switches or door control units. Another business unit, on the other hand, focuses on connector systems. With over 20,000 employees (2020), Kostal is one of the largest hidden champions in Germany and generates sales of over 2.5 billion euros. The company has been family-owned since it was founded in 1912 and is still managed by the family today, with Andreas Kostal being part of company's board as a chairman.

HELLA

Hella Hueck was founded in 1899 in Lippstadt as *Westfälische Metall-Industrie Aktiengesellschaft*. Since its foundation, it has specialized in lanterns, headlights and horns for bicycles and automobiles. As an automotive supplier, Hella is a typical example of how electrical engineering and lamp technology was pioneered by others, but Hella discovered the niche for itself and quickly specialized in automotive lighting. The first lamps on the first Daimler cars were already from Hella Hueck. Hella started with horns, candles with horns, and kerosene lamps for carriages. Hella's acetylene headlamp with plano-convex lens behind the converter and a convex surface backed with silver metal was a revolution and allowed a much more precise lens than before. Also, the first electric headlight was mounted on cars by Hella in 1908. Hella achieved fame by supplying headlamps for the Volkswagen in 1936. Other milestones were the first fully electronic flasher unit in 1957 and, in 1971, Hella was the first manufacturer of halogen main headlamps. In 2003, the world's first cornering light and dynamic

bend lighting went into series production. In addition to exterior and interior lighting for automobiles, Hella also develops special signals for official emergency vehicles and is also the world-market leader in this field.

Brose

Brosefahrzeugteile SE & Co. KG is an automotive supplier and was founded by Max Brose in 1908. Similar to Hella Hueck, Max Brose was sure that the still young and ambitious automotive industry could become a real competitor to carriages and chucks and invested in the growing motorization market. The company started in car lighting systems and later specialized in the production of metal goods, tools and materials for automobiles and airplanes. Initially, lighting, magnetic horns, windshields and air pumps were produced under the Atlas brand. Brose achieved world fame for its patent for the first crank-operated retractable window (1926). Brose also quickly became a world leader in the field of spark plugs and tachometers. The wrap spring brake was one of Brose's major innovations in the years that followed. It enabled the crank mechanism to adjust and hold the car window at any height. Brose caused a further sensation in 1936 with the 20-unit canister, which set new standards in terms of stability and durability. In 1963, Brose finally started series production of electric window regulators. From the 1960s onwards, Brose continued to lead in the field of new seat adjuster technology, which became Brose's second mainstay. To this day, Brose's global fame continues and every third vehicle in the world is equipped with at least one of a Brose component. Brose's latest innovations include e-bike drives and a new type of sensor technology for easy loading and unloading of vehicles: for example, the tailgate can be opened with a simple kick of the foot under the bumper.

4.3.3 High-Industrialization: Chemical industry

In addition to developments in medical technology, it was above all novel processes in agriculture that were decisive for the increase in population since the middle of the 19th century. The new masses of people posed major challenges for farmers, who now had to feed millions of more people. From then on, the decisive factor for the increase in agricultural yields was not only the use of new agricultural machinery but also of synthetically produced fertilizers. Around 1905, the chemist Fritz Haber developed the catalytic ammonia synthesis, which Carl Bosch used for the mass production of ammonia. As a result, synthetic nitrogen fertilizer could now be produced on a large scale, as for example by BASF, which opened its first plant using the Haber-Bosch process in 1913. The new mineral fertilizers asked for potash, phosphate and nitrogen in particular, after which numerous potash mines were dug in the German Empire and hidden champions such as K+S found a purpose and need to forge a new niche.

One of the many multiplier effects in the Industrial Revolution resulted from the complementary branches of the textile and chemical industries. The enormous increase in demand for textiles, triggered by the enormous increase in population, was at the same time one of the great engines of the German chemical industry, which dominated more than 90% of the world-market in the 19th century.

The *Badische Anilin- und Sodafabrik* (BASF), founded in 1865 by Friedrich Engelhorn, played a major role in this. Before producing fertilizers, plastics, explosives and rubber, BASF had its beginnings in the production of synthetic dyes. Engelhorn implemented the findings of chemist Justus von Liebig, who pointed out that tar dyes such as aniline dyes could be made from coal tar. Coal tar was produced as an undesirable by-product (after coke combustion) during the production of illuminating gas, which experienced a major boom in the period around the middle of the century, as the widespread installation of street lighting was just beginning and

was initially initiated with illuminating gas. Engelhorn himself owned a company for the production of illuminating gas at this time from 1848. And so he used coal tar for further processing into tar dyes such as aniline. By the turn of the century, BASF had grown as rapidly as it had become the world's leading chemical company and led the global market for synthetic dyes. Bayer also focused on the production of dyes, especially aniline and fuchsine. The chemical and pharmaceutical company was founded in 1863 by Friedrich Bayer and rose to become one of the most important chemical companies in the world, alongside BASF, Hoechst and AGFA. In particular, Bayer made a name for itself worldwide for medicines such as *Aspirin*, *Lycteol* and *Salophen*, in addition to the production of synthetic dyes. Hoechst was founded in 1863 by Carl Friedrich Wilhelm Meister, Eugen Lucius and Ludwig August Müller as *Theerfarbenfabrik Meister, Lucius & Co* and also focused on the production of tar dyes, especially for the textile industry. In addition to fuchsine and aniline, the company launched aldehyde green, which was developed by Hoechst for the first time. In addition to dyes, Hoechst was an early producer of inorganic acids and, like Bayer, of synthetic pharmaceuticals such as antipyrine (for pain reduction and fever relief) and a serum against diphtheria. In 1904, the company also succeeded in producing synthetic adrenaline.

These development within the pioneering mass markets implied a huge increase in both inputs and output markets. To match the enormous demand of new chemical supplier products, hidden champions such as K+S were able to set up their own niche markets.

K+S

K+S AG, formerly *Kali und Salz AG*, is based in Kassel and is one of the largest hidden champions with a workforce of almost 15,000 and annual revenues of 4 billion euros. K+S was founded in 1889, a time when the German chemical industry dominated world-markets and held market shares of over 90%. K+S is still the world's largest salt producer and a leader in the

production of potash and magnesium products for agricultural and industrial applications. The company was founded at a time of a boom in mineral-based nitrogen fertilizers, which helped the company to grow rapidly.

Boehringer Ingelheim

The origins of Boehringer date back to 1885 when Albert Boehringer founded the company in Nieder-Ingelheim. In the years that followed, Boehringer Ingelheim made a name for itself in biotechnology and in the manufacture of pharmaceutical products. In particular, the production of lactic acid-based baking powder was a worldwide success. With almost 52,000 employees worldwide, Boehringer is also one of the world's largest hidden champions. The company is family-owned and its management is represented by Hubertus von Baumbach, who is the great-grandson of the company founder Albert Boehringer. Another famous success of Boehringer was the lemonade brand Chabeso, which was launched on the market in 1911 on the basis of lactic acid.

4.3.4 High-Industrialization: Medical Engineering

A key cornerstone of the Industrial Revolution was the population explosion, which made multiplier effects possible in the first place. On the one hand, the higher number of consumers increased the demand for e. g. housing, textiles and food, and on the other hand, they provided the new factories with an army of industrial workers who were needed in the new mass industry. The population explosion was made possible first and foremost by technological advances in agriculture, such as new industrial machinery on the one hand and new fertilization methods on the other. The other major cornerstone of the population explosion was in justified advances in medicine. New possibilities of hygiene and medication drastically reduced infant mortality.

Robert Koch, Louis Pasteur and Max von Pettenkofer played a decisive role in this. Robert Koch was a physician and succeeded in discovering a wide variety of pathogens such as staphylococci as pathogens of wound infections, tuberculosis pathogens and cholera pathogens.

The breakthrough finally came about through the company *Lysoform Dr. Hans Rosemann GmbH* which patented a new disinfectant in 1900. The pharmacist Dr. Hans Rosemann developed the microbicidal properties of formaldehyde for the new disinfectant and celebrated a worldwide and groundbreaking success with it. In 1913, the chemical industrial company Schülke & Mayr GmbH finally succeeded in introducing a disinfectant for the end customer market under the brand name *Sagrotan*.

The industrial revolution also saw a transition in the production of medicines away from the pharmacy to industrial production. The first industrially synthesized finished pharmaceutical was the phenazone *Antipyrine* by Hoechst, which was approved in 1884. Other important drugs were *Salvarsan*, developed by Paul Ehrlich (Nobel Prize 1908 in medicine for his contributions to immunology) and also marketed by Hoechst, and *Aspirin*, which appeared in 1899. Pure acetylsalicylic acid was first synthesized by Bayer in 1897 and protected as the trademark *Aspirin* by Bayer in 1899. Above all, the analgesic, anti-inflammatory, and antipyretic aspirin represented a breakthrough in the treatment of numerous disease processes. Another milestone in the history of medicine was the discovery of physicist Wilhelm Conrad Röntgen who, during an experiment, observed a light source which should not have occurred. Röntgen investigated these X-rays, which had not been studied before, and found that they could penetrate matter. From then on, X-rays, as they were now called, found many uses in diagnostics for the analysis of bones, organs and tissue structures. Among other things, Röntgen received the Nobel Prize for it in 1901. While these discoveries changed our knowledge of diseases and cures, a number of niche firms such as Drägerwerk or Pari settled in medical engineering niches and produced a string of different tools and instruments that changed the game for medical treatments.

Drägerwerk

In 1889, Johan Heinrich Dräger and Carl Adolf Gerling founded the company *Dräger&Gerling* in Lübeck. The first products were valves for automatic beer presses, breathing gas cylinders and anesthesia devices, which were already being used by doctors worldwide at the turn of the century. The previously difficult-to-control dosage of anesthesia equipment prompted Dräger to invest intensive research in product innovations. The Roth-Dräger was a sensation that revolutionized anesthesia worldwide. Further developments such as the world's first emergency ventilators, helmet diving devices for divers and oxygen circulation devices made Dräger the world's leading company in medical technology. During the wars, Dräger provided various products such as army breathing apparatus, gas protection masks, diving rescuers, air renewal systems and high-altitude breathing apparatus as well as anesthesia and ventilation equipment for use in field hospitals. Today, Drägerwerk is still the world's leading company in the field of medical technology. For example, hospitals and doctors around the world rely on Dräger's, ventilation, anesthesia or patient monitoring equipment.

Pari

Pari developed groundbreaking inventions in the field of medical technology in the first half of the 20th century. Pari succeeded in developing nozzles that made it possible to finely atomize inhalation solutions into respirable Aerosol. During this time, Pari also succeeded in developing an electric and, above all, portable inhalation device. Further developments were inhalation devices based on a vibrating membrane technology, which enabled faster Aerosol production with significantly higher output. Pari was founded as early as 1906 in Wuppertal, Germany, and is today considered the world leader in respiratory therapy. Today, the company is headquartered in Starnberg, with additional locations in Weilheim and Gräfelfing.

4.3.5 Post Industrialization: Software Industry and Digital Advancements in Medical Engineering & Automotive

Although hidden champion key industries such as mechanical engineering or medical engineering evolved over decades, digitized industries created entirely new opportunities. The technology revolution of computer-based instruments has greatly advanced many areas of the hidden champions' core industries and created space for new software-based niche markets. In medical technology, completely new methods of treatment using digital measuring and analysis devices are enabling new treatment methods and therapy concepts in hospitals and medical practices. Interventions have thus become not only more precise and easier for physicians to handle, but also far more efficient with better therapeutic results for patients. Robotics solutions are also increasingly being used in the field of automation in modern clinical practice. Robots are increasingly taking on tasks where they outperform humans in terms of precision and reliability. A major milestone, for example in the field of medical engineering, was the invention of CT. Computed tomography is a radiology procedure that uses a computer to calculate digital cross-sectional images from the absorption values of X-rays. The first devices were used as early as 1972 and revolutionized radiology. Another milestone was the first robotic solutions in medical technology. KUKA Robotics has specialized a division of its company in automation in medical technology and, depending on the application, uses sensitive and collaborative lightweight robots such as the LBR MED or robots for high payloads. Applications in medical technology include minimally invasive surgery, radiation therapy and systems for angiography. Some examples of hidden champions using the digital revolution in the second half of the 20th century for new niches are Brainlab, Asclepion Laser Technologies, PTV AG or GK Software.

Brainlab

The Brainlab Group was founded in 1989 in Munich, Germany, where it is still headquartered. The company develops hardware and software solutions for image-guided surgery and radiotherapy. The company now operates from over 18 offices worldwide and deploys its systems in approximately 80 countries worldwide. The company specializes in applications in oncology, surgery, medical imaging and cloud-based image transmission solutions. As a result, Brainlab technologies are used in over 5000 hospitals worldwide. Brainlab's goal is to make surgeries more efficient, safer, and less invasive to better help patients. In the area of curve navigation, digital surgery software and O.R. integration are combined to make patient data available in an uncomplicated way.

Asclepion Laser Technologies

Asclepion Laser Technologies is a niche market company specializing in the use of various laser technologies in medical applications. The company was founded in 1977 in Jena (Thuringia) and is one of the worldwide market leaders in the fields of aesthetic laser treatments and surgery laser devices. Asclepion Laser Technologies is represented worldwide and operates in more than 60 countries worldwide. An optics cluster has developed around Jena since the middle of the 19th century. And so Asclepion is one of the leading optics specialists in the field, along with Zeiss, which made the breakthrough with the argon laser in 1984 for the treatment of vascular lesion in the eyes. Among the many other applications of laser technology are scar treatment, pigment removal and tattoo removal.

PTV AG

PTV AG was founded in 1979 by Hans Hubschneider and Michael Sahling and is headquartered in Karlsruhe, Germany. It has been owned since June 2017 by Porsche Automobil Holding, which bought 97% of the shares for 312 million euros. PTV AG specializes in simulation software for traffic, mobility and logistics and had its beginnings in computer-aided route planning. For example, early projects included route network planning for bus and road traffic in Mannheim or route planning for Langnese-Iglo. New projects include, for example, the multimodal traffic simulation for the arrival and departure routes of the Formula 1 race track in Abu Dhabi. Also, the movement behavior of Formula 1 visitors in the spectator stands could be modeled with their software applications.

GK Software

GK Software was founded in 1990 by Rainer Gläß and Stephan Kronmüller and is based in Schöneck, Germany. The company specializes in software solutions for retail companies. It has a strong international presence with 14 locations worldwide, including the USA, Russia, South Africa, Switzerland, Ukraine and the Czech Republic. Its products thus include software programs for point-of-sale systems, warehouse equipment, label printing and voucher management applications.

5. The Rise of a Research Community

Research on hidden champions was pioneered by Hermann Simon in the 1990s. Simon noticed that the export success of the German economy could not only be attributed to large corporation, but to a great extent also to smaller niche firms, he later termed *hidden champions*. It subsequently took several years for the research community to take up Simon's ideas and expand the research effort (figure 6). Above all, it is clear that research initially remained primarily in Germany and was initially intensified in the German area. Thus, Christian Rasche (2003) investigated different types of hidden champions and distinguished between Hidden Product Champions, Hidden Professional Champions and Multi-Arena Champions. Helmut Haussmann (2003) elaborates on the internationalization strategies of hidden champions and find that that the visionary corporate leaders serve a key element for the ambitious internationalization strategies of hidden champions.

Other earlier studies on hidden champions primarily examine individual country samples of hidden champions, such as Voudouris et al. (2000). Such articles often adapt Simon's definition to the size of the respective economy in order to be able to select hidden champions at all (Schenkenhofer, 2022). An example of this is Voudouris et al. (2000), as stated further above.

It also becomes clear that globally there are different research clusters which increasingly investigate hidden champions. Besides Germany, hidden champion research takes place in Asia, especially in South Korea. This is also due to the fact that hidden champions are a widespread phenomenon in South Korea. In a global comparison, South Korea a country with relatively large number of hidden champions. Next to Byungun Yoon (2013), numerous other studies of Korean hidden champions exist, e.g., Lee (2016a) who runs a SWOT Analysis of Korean hidden champions. Lee (2016b) and Kim & Sung (2019) analyze the general success

factor of Korean hidden champions or Lee & Yoon (2015), who instead examine the global innovation capability of Korean hidden champions.

Another major contribution from a geographically concentrated effort is a joint compendium by researchers from 18 countries from Southeastern Europe and Russia. The authors mostly examine individual country samples of hidden champions. In total they find 165 hidden champions. They use Simon's questionnaire to collect the main characteristics of these companies, comparing the characteristics with those Simon could find for Germany. Examples of this collective work are Omazić and Vlahov (2013) who analyze Croatian hidden champions, Riisalu and Leppiman (2013) who analyze an Estonian sample, and while Daneyko and Golenchenko (2013) analyze a Belarusian sample, or Palii and Oksenyuk (2013) analyze success factors of Ukrainian hidden champions.

While Simon certainly built the foundations for research on the concept of hidden champions, this research can be linked to efforts by a stream that studies the economics of niches. Niche marketing is also incorporated in the work of Philip Kotler, who is also a highly renowned marketing professor in the field. His 1967 publication '*Marketing Management*' is the reference textbook in marketing education worldwide. In it, Kotler describes niche strategies as focusing companies on customers with highly specialized needs that emphasize quality and therefore pay a premium for tailored offer. The niche is therefore unattractive for most competitors as they might be unable to meet the specialized customer needs (Kotler and Keller, 2021). Niche markets therewith are „a small market consisting of an individual customer or a small group of customers with similar characteristics or needs (Dalgic and Leeuw, 1994, p.40) and niche strategies describe the “positioning into small, profitable homogeneous market segments [...] ignored or neglected by others” (Dalgic and Leeuw, 1994, p. 42).

For Kotler (1991), specialization is central to niche marketing, whereby specializations can result from various trajectories, such as geographic specialization, quality/price specialization, or service specialization. Because niche markets are narrow and the underlying strategy is highly specialized, this results in an enormous customer knowledge of the niche company about the contract partner. Thus, it is better able to offer a tailored offer and satisfy customer needs than anyone else in the market. Niche markets are therefore profitable for Kotler (1991) since the niche enterprise can require a substantial markup for this increase in value. While mass markets achieve profitability through economies of scale, niche markets achieve profitability through high margins (Dalgic and Leeuw, 1994). Moreover, the niche marketing literature distinguishes two approaches of niche marketing: niche marketing (bottom-up) versus segmentation (top-down approach). A bottom-up approach that refers to a creative process of providing a tailored offer to a specialized customer. Starting with one or only a few customers, the niche marketer aims at expanding its offer to larger number of customers. The top-down approach instead is referred to as segmentation, where niche marketing is the last step of sequential stages (segmentation, targeting, positioning, niching) (Chalasani and Shani, 1992; Dalgic, 1998). In this latter case, a generally huge market is grouped into smaller pieces, e.g., by geographic means. A number of articles investigates different aspects of niche marketing facets, others focus on niche market in certain industries: Noy (2010) focuses on the time-bound evolution of niche markets using a population ecology perspective. Parrish et al. (2006) analyze mature industries and how applying a niche strategy can help to increase competitiveness. They emphasize that a deep understanding of customers is key to thrive within niche markets. Toften and Hammervoll (2009) investigate internationally oriented niche firms and their strategic marketing approach. Their exploratory research is based on structured interviews with five niche firms finding that the selection of customers and the respective niche market mainly results from the tradition and market structures of the niche. In another article, Toften and

Hammervoll (2010) analyze further facets of the niche market strategy and find that product focus and close-customer orientation to stand out as key characteristics. Thus, they conclude that managers in niche firms should always emphasize quality and continuous product and technology improvement to satisfy niche markets demands. In yet another article, Toften and Hammervoll (2011) study international market selection process and growth directions of niche firms. They find that niche firms tend to expand internationally through long-term relationships with downstream channel partners. While the latter articles investigate theoretical facets of niche markets generally, some other articles focus on specific niche markets. For example, Parrish et al. (2005) examine the US textile and apparel industry, Hammervoll, Mora and Toften (2014) the wine industry in general and Toften, Mora and Hammervoll (2016) the market for Bordeaux Grand Crus in particular, or Ottosson and Kindström (2016), who examine niche market strategies in the steel industry.

6. Contemporary Discussion and Research

While we so far have outlined the nature and evolution of hidden champions, and how this reverberated in the academic debate, this section now aims at discussing the contemporary topic of how the Covid19 pandemic has already and will impact hidden champions. Since March 2020, the Covid19 pandemic has kept the world on tenterhooks. It triggered a global economic shock and led to a shortage in both supply and demand. To achieve contact constraints, a shutdown of almost the entire public life was led into comprehensive shutdowns. The exogenous shock brought the global and regional economic cycle to a standstill in phases. Research to date has examined the impact of the economic impact of the Covid19 pandemic on the economy as a whole (Maliszewska, Mattoo and Van Der Mensbrughe, 2020), entrepreneurship (Belitski et al., 2021; Khlystova, Kalyuzhnova and Belitski, 2022), and family businesses and SMEs in particular (Jayakumar and De Massis, 2020; Soluk, Kammerlander and

De Massis, 2021; Meffert, Mohr and Richter, 2020). A survey by the KfW Mittelstand's panel found that lasting changes will come from the Covid19 pandemic. According to the survey, about one-third of SMEs in Germany expect permanent changes in consumer behavior, as consumption habits and life routines may have changed permanently (KfW, 2021). Particularly and directly affected by the restriction measures to reduce contact were industries such as the accommodation and catering industry, stationary retail, tourism, and the event industry. However, it is also apparent that the crisis is affecting industries in highly diverse ways. For example, one-third of the companies surveyed perceive no negative impact of the crisis on their product demand. So far, none of the family business and SME research studies has looked at the impact of the crisis on hidden champions. There is a particular need for research in this area, due to the high level of global activity and the high overall economic importance of hidden champions. Interestingly, the literature on hidden champions has so far described them as a particularly crisis-resistant type of company. Their economic resilience is assumed to stem from their 1) close-customer relationships, their 2) financial independence, their 3) technology leadership, and 4) a strong employee retention. Even if hidden champions have a certain market power in their niche markets and a certain independence, hidden champions are affected by global economic crises on both input and output markets precisely because of their high level of global activity. Hidden champions generate an average of 70% (Simon, 2009) of their sales through foreign business and also purchase standardized components and raw materials worldwide. They are therefore directly affected by supply bottlenecks and demand shocks. Especially in the Covid19 pandemic, the sudden and unexpected occurrence of the exogenous shock led to uncertainty in the markets (De Massis and Rondi, 2020). In addition, the lack of experience in dealing with pandemics and the resulting high level of uncertainty and lack of planning certainty in the markets led to investment bottlenecks. Hidden champions are thus directly affected by the Covid19 crisis. But it turns out that hidden champions show differences

in their resilience in the Covid19 crisis that cannot be explained by different industries alone. It needs to be investigated whether the digital visibility of hidden champions is a crisis resilience factor. Simon (2009) generally assumes that hidden champions have a deliberate strategy of moving below the radar to prevent potential competitors from entering their niche markets. But it turns out that hidden champions differ from each other in their digital visibility. Thus, we need to know if more visible hidden champions more crisis-resistant? The reason for this could be that the digital visibility of hidden champions reinforces trust with stakeholders. This is particularly important for niche markets and the high asset specificity inherent in them. The Covid19 crisis has reduced personal exchanges to a minimum. Hidden champions who succeed in demonstrating a digital presence can thus mitigate the impediments to communication.

7. Conclusion

This monograph illustrates the evolution of hidden champions from both a geographical and historical dimension. First, we introduced the concept of hidden champions and their key business strategies. Then, we describe their global distribution, resulting from complementarities between their business strategies and the respective institutional environment. Moreover, as niche market companies, the business models of hidden champions are particularly tied to the technology development of their end-user markets. Thus, our historical roadmap introduces three different eras of hidden champions: a pre-industrial, an industrial and a post-industrial era. In each era, hidden champions succeeded in differentiating new technologies and achieving specialization advantages. Our historic roadmap also presents a number of company examples. In addition to the temporal and spatial development, our work also shows the course of the academic debate on hidden champions. While research initially took a decade to follow up on Simon's seminal discoveries, it clearly picked up speed since the

turn of the millennium. But some aspects are still under-researched and require further efforts (Simon, 2022).

Next to the contemporary research discussion presented further above, a number of further open research questions are presented in the following. While research has investigated a lot of aspects of the strategic management of hidden champions and their human capital strategy, the employee motivation within hidden champions is still under researched. One stream of future should investigate the theories of organizational identification and affective commitment and their relation to hidden champions (Mael and Ashforth, 1992; Allen and Meyer, 1990). Hidden champions show remarkably low turnover, absenteeism, and high retention rates. Using the theories of organizational identification and affective commitment might help to shed light on this phenomenon (Mowday, Steers and Porter, 1979). Training opportunities, internal career opportunities and reward systems encourage investments in the stock of hidden champions' specific human capital (Van Dick et al., 2008). Thus, the niche strategy helps to explain why the investment in which kind of human capital is especially important for hidden champions. What's more, the often-rural location reduces outside opportunities for employees and helps to internalize the quasi rent of specific investments in the stock human capital. In addition to that, the low labor mobility allows to build place-specific social capital that deeply embeds employees in social networks where they live. Future research needs to build on these considerations and study the determinants of organizational identification and affective commitment in the case of hidden champions.

Another stream should analyze the determinants of management succession of hidden champions. Most family businesses pursue the goal of business succession within their own family (Lansberg and Astrachan, 1994; Schröder, Schmitt-Rodermund and Arnaud, 2011; Schröder and Schmitt-Rodermund, 2013). The proportion of family-owned hidden champions has decreased from 60% to 50% between 1996 and 2012, as Simon (2009) estimates. In addition

to the demographic development in Western countries, an increasing young people's rural exodus is considered to be a major challenge for business succession in Western Europe. Young students who move to urban areas to study often have little incentive to take over family businesses in rural areas (Zellweger, Sieger and Halter, 2011; Larsson et al., 2017). Thus, the impediments of the hidden champions management succession need to be subject of future research (Schlepphorst and Moog, 2014).

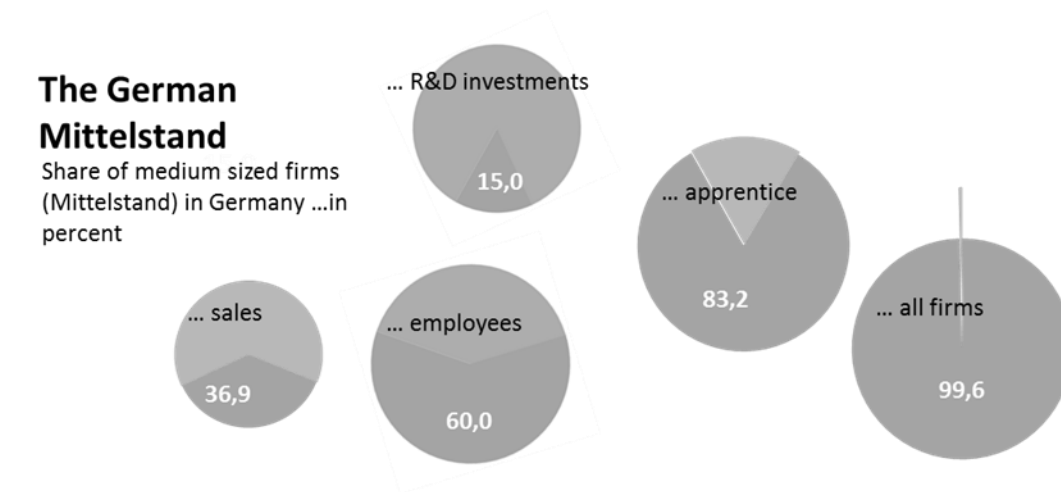
A third stream should investigate the effects of organizational prestige on hidden champions. Organizational prestige describes one's own beliefs about how other people outside the organization "judge or evaluate the status and prestige of the organization" (Carmeli, 2005, p. 444). It is an open question how hidden champions' organizational prestige could affect the success of business succession and employee loyalty. Given the nature of hidden champions, the prestige might play an underestimated role in explaining succession motivation and employee retention (Bergami and Bagozzi; 2000; Smidts, Pruyn and Van Riel, 2001). The world-market and technology leadership might both determine the prestige of hidden champions and contributes to explain how and why hidden champions differ from other Mittelstand companies.

Finally, a fourth topic revolves around M&As of hidden champions in Germany. The number of international M&As (especially from China) is steadily increasing within Germany. Consequently, the German government amended the trade regulation (AVV), lowering the barrier of foreign investment that needs governmental approval in Germany. While some argue that the M&A's cause a threat of technological leadership, at the same time it is apparent that some hidden champions depend on foreign investments to fight liquidity constraints and foster management succession (Boateng, Qian and Tianle; 2008; Liu and Woywode, 2012; Bian and Emons, 2017). It is necessary to understand who acquires hidden champions, what is the intention of these kind of M&As and finally it is needed to study the changes that occur within

acquired hidden champions to infer important implications for public policy. While so far, it seems that the niche market strategy of hidden champions has paid off and their enduring success suggests that they emulate a stronger economic resilience than most firms, as the pandemic revealed, there is much to know about this type of firms and the niche market strategy beyond this work. Further research is needed, not only to increase our understanding of this firm type but also to develop management concepts and policy advices.

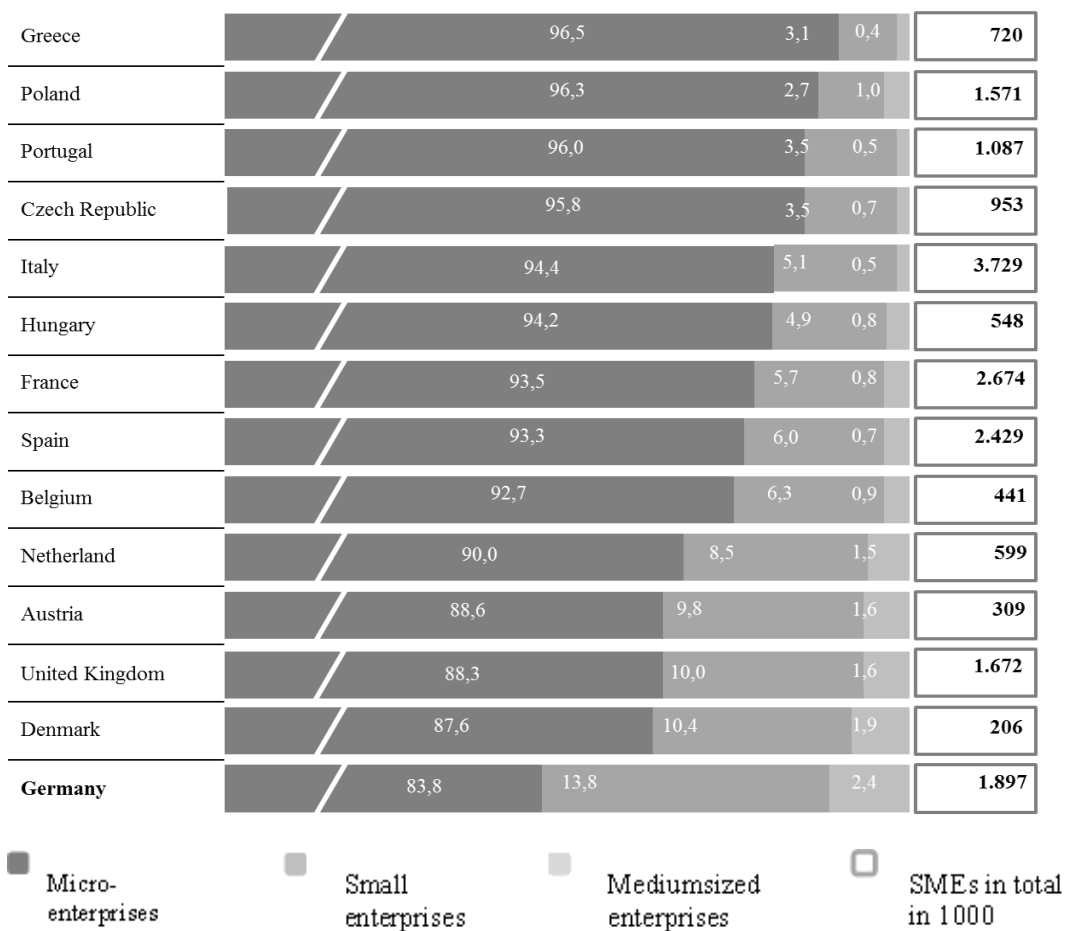
Figures

Figure 1: Significance of Mittelstand firms in Germany



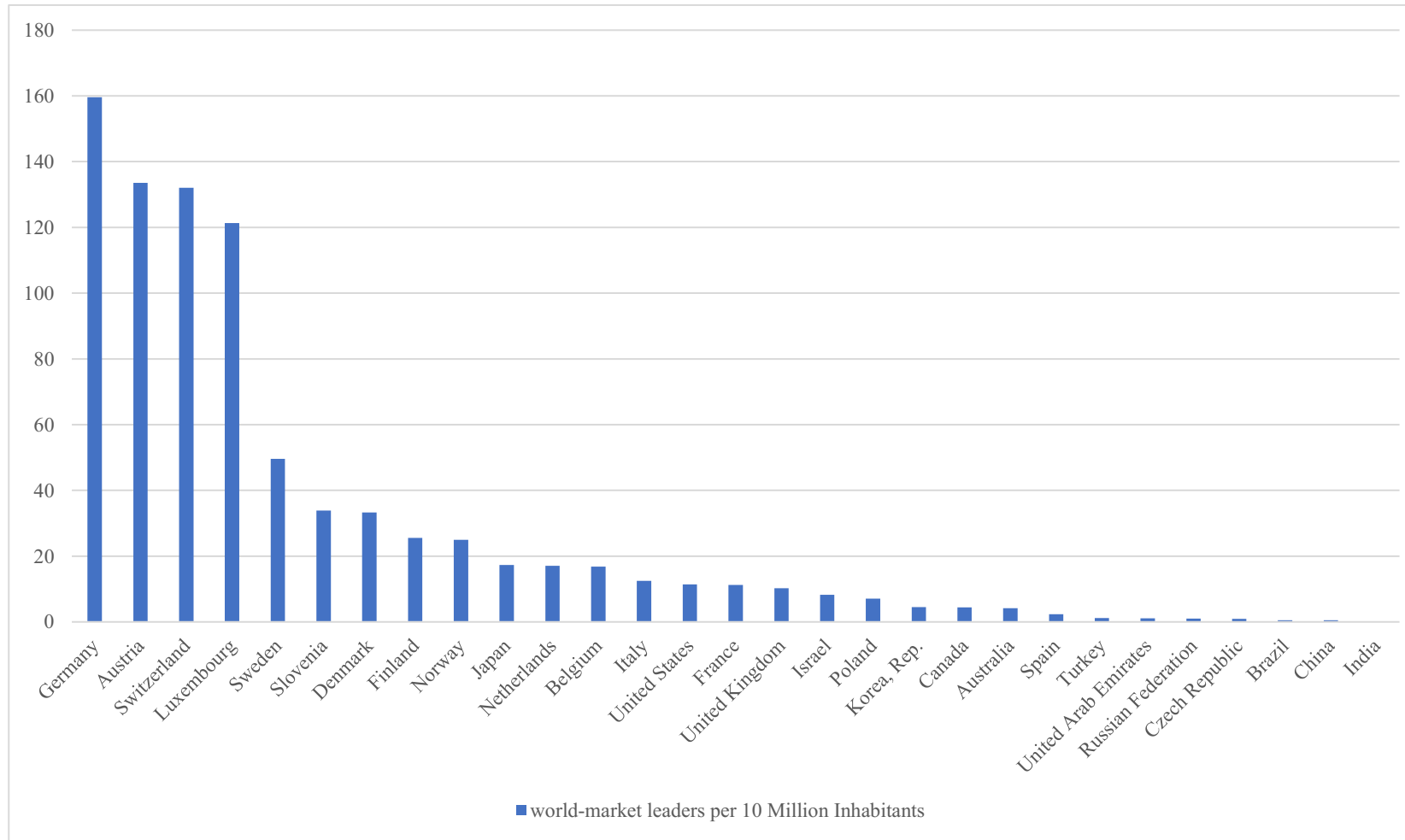
source: Audretsch and Lehmann (2016, p.17)

Figure 2: SMEs in Europe (in % of small and medium sized firms)



source : Audretsch and Lehmann (2016, p.19)

Figure 3: The Worldwide Distribution of Hidden Champions



source: own depiction, data retrieved from Rammer and Spielkamp (2015), measured as per 10 Million capita.

Figure 4. Eras of Industrialization and notable inventions, source: own depiction

Eras of Industrialization and notable inventions

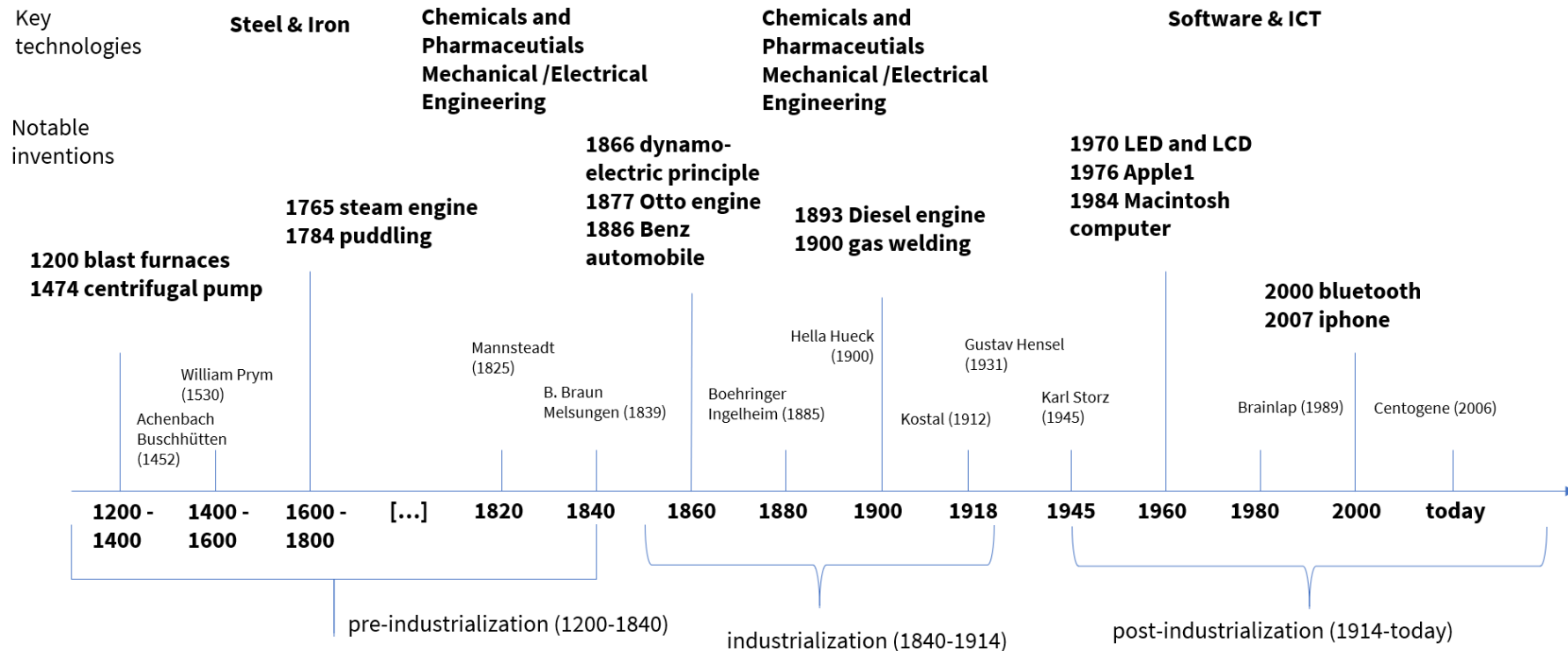
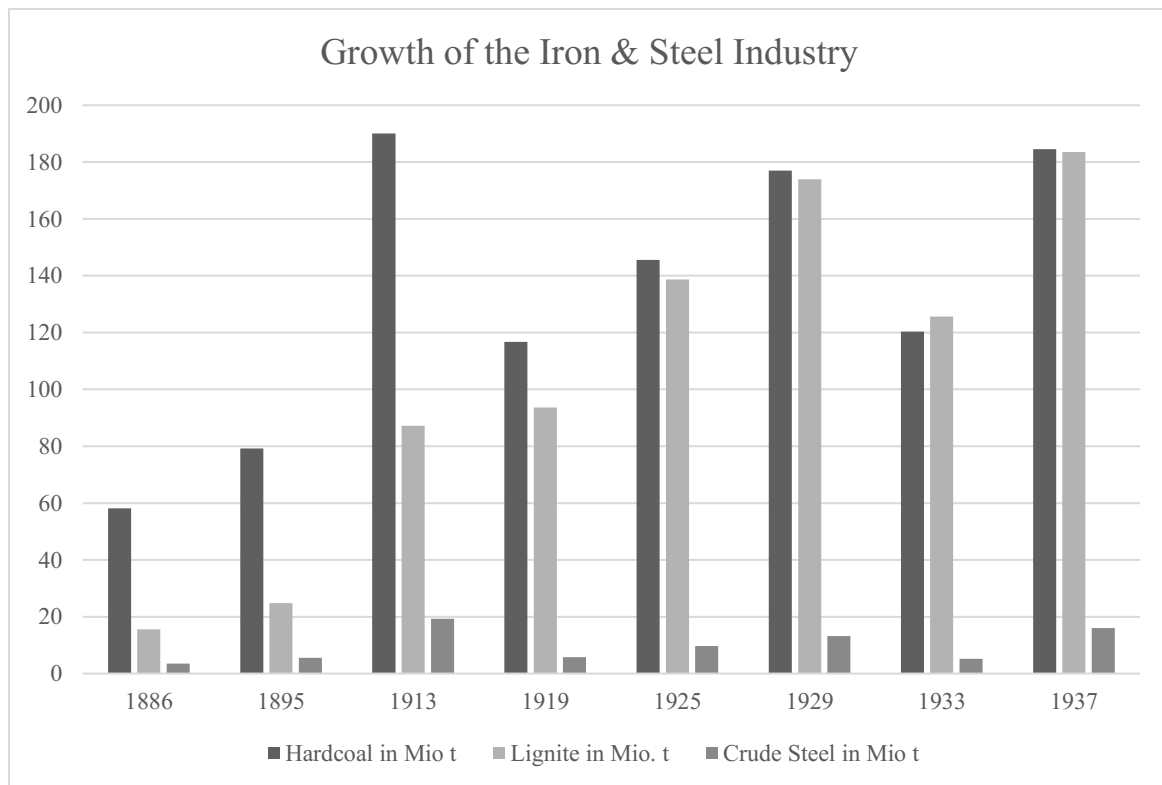
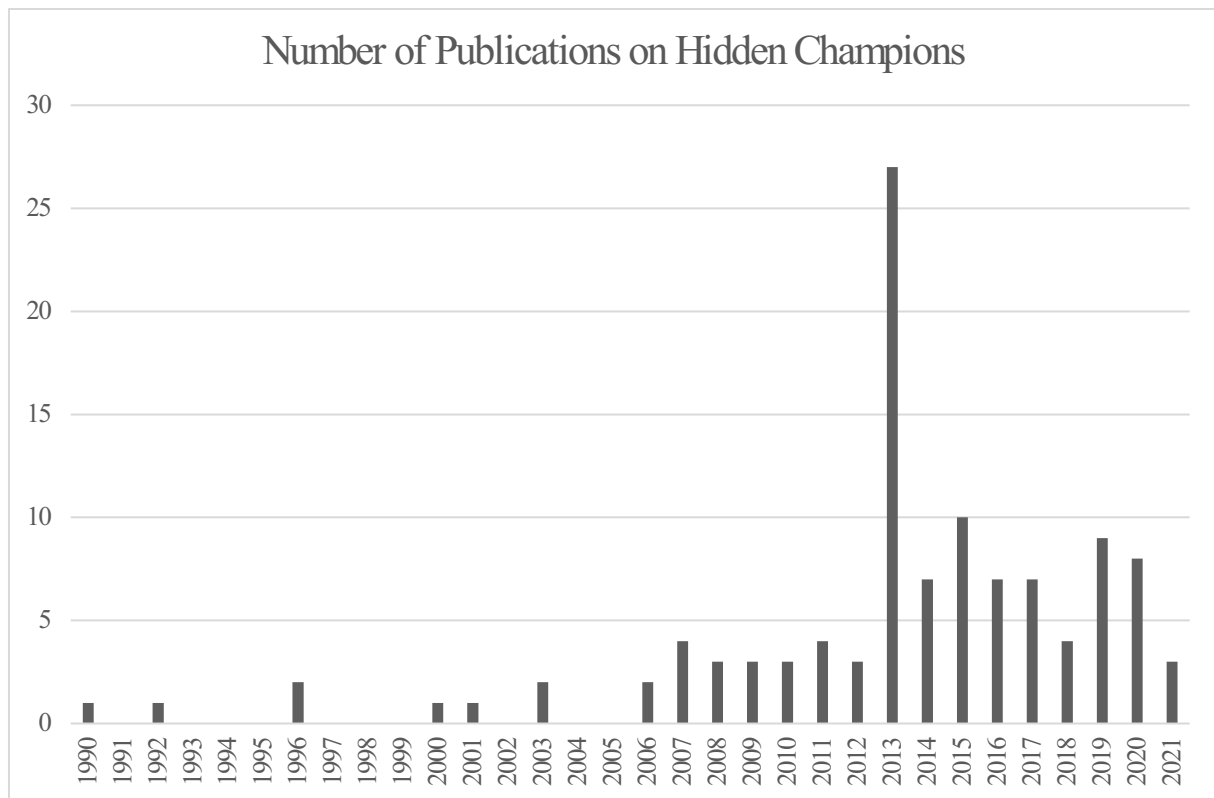


Figure 5. Growth of the Iron & Steel Industry



source: own depiction, data retrieved from BPB (2015)

Figure 6. Number of Publications on Hidden Champions



source: own depiction

Tables

Table 1: Who belongs to the Mittelstand?

	Number of employees	Sales in Euros per year	Balance sheet in Euros per year
Germany			
Small Enterprises	Up to 9	Less than 1 million	
Medium Enterprises	10 to 499	1 to 50 millions	
Large Enterprises	500 and more	More than 50 millions	
European Union			
Small Enterprises	10 to 49	Up to 10 millions	Up to 10 millions
Medium Enterprises	50 to 249	Up to 50 millions	Up to 43 millions
Large Enterprises	250 and more	More than 50 millions	More than 43 millions

sources: IFM Bonn (2014), Audretsch and Lehmann (2016, p.17)

Table 2: Key characteristics of hidden champions

	Description	Logic
Intensive internationalization	Focus on core clients and target markets worldwide	Monopolistic power and lower price sensitivity
Incremental and open innovation	Series of small improvements made to a company's existing products or services in close-cooperation with customers and suppliers	Close customer-supplier relationships reduce outside opportunities and increase switching costs, lowering transaction costs by improving trustworthiness
Flexible production and manufacturing	Low set-up costs, lean production and short production runs to fulfill key clients demand	Increasing and adding value to key customers and thus reduces outside opportunities by increasing customer loyalty
Specific human capital	Highly skilled and cross-trained workers, worker initiatives and empowerment	Enabling open innovations, flexible reaction towards customer needs, increased firm loyalty

source: own depiction

Table 2: Key characteristics of hidden champions (cont'd)

	Description	Logic
Solid financing	Independent financial basis, almost internal financing by using profits as a source of funding new projects.	Decisions are independent of the source of finance
Rural endowment	Close relationships to key stakeholders, natural resources and/or family origin	Reduced costs by close cooperation with rural stakeholders, less outside opportunity costs for suppliers and workers
Long-term leadership and organizational architecture	Long-term oriented leadership and governance structures focused on a transaction cost minimizing organizational architecture	Reducing agency costs and other transaction costs by a long-term orientation and reduced conflicts of interest by diverse shareholders

source: own depiction

Table 3: Exemplary Empirical Studies on Hidden Champions

Author and Year	Analyzed Key Characteristic	Sample and Country	Method	Key Finding
Witt (2015)	Intensive internationalization	15 German hidden champions, 15 British hidden champions	descriptive analysis	Hidden champions enter markets as Born Globals and tend not to adhere to the Uppsala model
Venohr and Meyer (2007)	Incremental and open innovation	220 hidden champions, Germany	descriptive analysis	autonomous decision-making authority of the management, long-term relationships with stakeholders and efficient process management key success factors for hidden champions
Yoon (2013)	Incremental and open innovation	154 hidden champions, South Korea	comparisons of means	Innovation performance of hidden champions is based on market initiative and technological competence
Rammer and Spielkamp (2015)	Incremental and open innovation	1583 hidden champions, Germany	comparisons of means	Hidden champions are more innovative than ordinary SMEs, which is partly due to close cooperations with external research institutions
Rammer and Spielkamp (2019)	Incremental and open innovation	1637 hidden champions, Germany	comparisons of means	Though hidden champions show a higher innovation performance than the control group, they do not invest more in R&D

source: own depiction

Table 3: Exemplary Empirical Studies on Hidden Champions (cont'd)

Author and Year	Analyzed Key Characteristic	Sample and Country	Method	Key Finding
Audretsch, Lehmann and Schenkenhofer (2021)	Geography, specific human capital	1372 hidden champions, Germany	Negative binomial regressions	Vocational education systems, dual board systems, strong rural areas among other factors to determine the worldwide distribution of hidden champions
Vonnahme and Lang (2019)	Geography, rural endowment	1691 hidden champions, Germany	Survey, interviews	Rural remoteness is no disadvantage for the innovation performance of hidden champions
Benz, Block and Johann (2021)	Geography, rural endowment	1645 hidden champions, Germany	OLS regressions	Regions containing a high concentration of hidden champions show a higher economic performance
Benz, Block and Johann (2020a)	Economic performance	4677 manufacturing firms, Germany	comparison of means, OLS Regressions	Hidden champions outperform a control group of other manufacturing firms; the outperformance effect decreases with firm size
Benz, Block and Johann (2020b)	Financial performance	99 listed hidden champions, Germany	comparison of means	Listed hidden champions only differ regarding their lower beta risk from the DAX30 control group

source: own depiction

Table 4. List of some countries that do not levy an inheritance tax

Country	Year of abolishment
Australia	1979
Austria	2008
Canada	1972
Cayman Islands	Never levied
China	Never levied
Guernsey	Never levied
Hong Kong	2006
India	1985
Israel	1980
Jersey	Never levied
Macau	2006
Mexico	1961
New Zealand	1992
Norway	2014
Portugal	2004
Russia	2006
Singapore	2008
Slovakia	2004
Slovenia	Never levied
Sweden	2004
Vanuatu	Never levied

source: own depiction

Table 5. The historical eras of hidden champions and exemplary firms

HIDDEN CHAMPION	FOUNDED	INDUSTRY
1ST ERA: PRE-INDUSTRIALIZATION (1400-1850)		
ACHENBACH BUSCHHÜTTEN	1452	iron foundry
ISABELLENHÜTTE HEUSLER	1482	copper smelter
WILLIAM PRYM	1530	metal production
STAHLWERKE ANNAHÜTTE	1537	steel
2ND ERA: INDUSTRIALIZATION (1850-1914)		
BOEHRINGER INGELHEIM	1885	chemistry & pharmaceuticals
HELLA HUECK	1899	automotive
DRÄGERWERK	1889	medical engineering
PARI	1906	medical engineering
BROSE	1908	automotive
KOSTAL	1912	electrical engineering
3RD ERA: POST-INDUSTRIALIZATION (1945-TODAY)		
ASCLEPION LASER TECH.	1977	medical engineering
PTV	1979	software
BRAINLAP	1989	medical engineering
GK SOFTWARE	1990	software

source: own depiction

Table 6. Raise of Railways in Germany

Year	Railway Line length (in 1000 km)	Number of rolling stock (in 1000 units)	Amount of goods transported (in Mio t)
1850	4.8	0.8	2.8
1870	18.3	5.5	69.8
1880	33.7	10.9	165.2
1890	41.9	14.2	217.8
1900	49.9	19.1	360.2
1913	60.8	29.5	41.2
1925	56	28.1	49.9
1929	56.6	24.6	48
1937	59.1	21.1	51.1

source: BPB (2015)

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